

- OB Site II –CAPE produced Final SI copies and shipped to all stake holders on 24 Apr 2018. AEC exercised Optional CLIN 0007 on 25 APR 2018 for conducting RI at Site II. CAPE started planning, drafting work plan, and drafting addendum to Explosive Site Plan (ESP). CAPE and Parsons on 14 June 2018 discussed the possibility of using new MEC HA that is available to the team and AEC had no objections. CAPE and parsons completed the Draft RI and addendum to ESP and distributed via email to AEC, USACE and Ft Bliss on 10 July 2018. CAPE received AEC and USACE comments on 02 OCT 2018. CAPE/Parsons team completed RTC's, revisions to QAPP, and distributed to AEC, USACE and FT Bliss team on 02 Nov 2018 and received approval on same day. **CAPE/Parsons team is preparing the Draft Final QAPP and will distribute to all stakeholders.**

OB/OD Site I –Draft RI was submitted on 17 July 2017. AEC, Ft Bliss and USACE are reviewing the report. NO OB/OD Site I –Draft RI was submitted on 17 July 2017. AEC, Ft Bliss and USACE are reviewing the report. NO additional comments were received and AEC confirmed to CAPE to proceed with responses and revisions. CAPE submitted RTC's and revised report on 20 OCT 2017. Received AEC confirmation on 13 NOV 2017. Ft Bliss comments were distributed to CAPE Team on 07 DEC 2017. CAPE prepared responses and revisions to the report. To address Ft Bliss comment (#4) CAPE discussed with PDT and agreed that additional field work is needed. Agreed during the meeting that a Tech Memo will be drafted for PDT's review and concurrence. Tech memo was drafted and submitted to AEC, USACE and Ft Bliss on 07 Feb 2018. AEC submitted to TCEQ and received comments from TCEQ, specifically UXOPRO on 15 Feb 2018. CAPE team prepared responses and provided them to AEC/USACE/Ft Bliss on 21 Feb 2018. After additional discussions, CAPE/Parsons team revised the Tech Memo and submitted revised file to AEC/USACE/FT Bliss on 10 APR 2018. **AEC forwarded the revised tech memo to TCEQ on 10 APR 2018. TCEQ accepted the revised Tech Memo on 11 May 2018. CAPE/Parsons coordinated the work with FT Bliss and completed field work on 27 and 28 SEP 2018 and DQCR's were distributed. Currently completed on the anomaly count spreadsheet. CAPE/Parsons is drafting the Technical Memo for supplemental field effort and will be submitted ASAP.** additional comments were received and AEC confirmed to CAPE to proceed with responses and revisions. CAPE submitted RTC's and revised report on 20 OCT 2017. Received AEC confirmation on 13 NOV 2017. Ft Bliss comments were distributed to CAPE Team on 07 DEC 2017. CAPE prepared responses and revisions to the report. To address Ft Bliss comment (#4) CAPE discussed with PDT and agreed that additional field work is needed. Agreed during the meeting that a Tech Memo will be drafted for PDT's review and concurrence. Tech memo was drafted and submitted to AEC, USACE and Ft Bliss on 07 Feb 2018. AEC submitted to TCEQ and received comments from TCEQ, specifically UXOPRO on 15 Feb 2018. CAPE team prepared responses and provided them to AEC/USACE/Ft Bliss on 21 Feb 2018. After additional discussions, CAPE/Parsons team revised the Tech Memo and submitted revised file to AEC/USACE/FT Bliss on 10 APR 2018. **AEC forwarded the revised tech memo to TCEQ on 10 APR 2018. TCEQ accepted the revised Tech Memo on 11 May 2018. CAPE/Parsons coordinated the work with FT Bliss and completed field work on 27 and 28 SEP 2018 and DQCR's were distributed. Currently completed on the anomaly count spreadsheet. CAPE/Parsons is drafting the Technical Memo for supplemental field effort and will be submitted ASAP.**



DEPARTMENT OF THE ARMY  
HEADQUARTERS, U.S. ARMY AIR DEFENSE ARTILLERY CENTER AND FORT BLISS  
FORT BLISS, TEXAS 79916-0058



15 July 1997

REPLY TO  
ATTENTION OF

Directorate of Environment

(b) (6)

Hazardous and Radioactive Materials Bureau  
RCRA Technical Compliance Program  
New Mexico Environment Department  
2044 Galisteo  
Santa Fe, NM 87505

Dear (b) (6)

Please find enclosed three copies of the Final RFI Report for five SWMU's listed on our RCRA permit (four landfills and one open demolition area) for your review. The Fort Bliss Directorate of Environment (DOE) has previously submitted the Final RFI for the four evaporation ponds listed on the permit. Fort Bliss DOE is aware that you and your staff probably face an enormous work load. I respectfully request, however, an expedited review of these two reports if at all possible. DOE faces the potential loss of existing funding for follow on work at these SWMU's if the work cannot be identified and funds obligated before mid September 1997. Any consideration you can make to this schedule without creating unfairness for your other clients would be greatly appreciated and speed the closure of these sites.

If you have any questions or concerns please do not hesitate to call (b) (6) the Fort Bliss DOE technical point of contact. (b) (6) can be reached at (b) (6)

Sincerely,

(b) (6)

Chief, Multimedia Compliance Div., DOE  
Fort Bliss, Texas

cc.

(b) (6)

enc. (3)



THOMPSON  
PROFESSIONAL  
GROUP, INC.

6110 Clarkson Lane  
Houston, Texas 77055  
(713) 956-4100  
(713) 956-4121 Fax

Engineering  
Architecture  
Environmental Sciences  
Surveying & Mapping

## LETTER OF TRANSMITTAL

---

**To:** (b) (6)  
**Company:** Fort Bliss Directorate of Environment  
**From:** (b) (6)  
**Date:** July 3, 1997  
**Job No:** 867-02.06  
**Re:** Fort Bliss RFI Final Report

---

**We are sending you:** Five copies of Volumes 1 and 2 and one copy of Volume 3 of the Fort Bliss RFI Final Report. Four sets of Volumes 1 and 2 are addressed to Jim Stefanov. Also included are replacement covers for the Draft Final Report Volume 2, Analytical Laboratory Reports, which will now become Volume 3 of the Final Report. The additional copy of Volume 3 is provided for transmittal to the NMED. Please let me know if you have any questions about this material.

Thanks for your help in revising the Draft Report.

---

**Remarks:**

---

Signed (b) (6)





**THOMPSON  
PROFESSIONAL  
GROUP, INC.**

6110 Clarkson Lane  
Houston, Texas 77055  
(713) 956-4100  
(713) 956-4121 Fax

*Engineering  
Architecture  
Environmental Sciences  
Surveying & Mapping*

July 3, 1997

(b) (6)

Directorate of Environment  
Building 515B  
Fort Bliss, Texas 79916-6816

Re: RFI Final Report, Fort Bliss, Texas  
Contract No. DACA63-94-D-0009  
Delivery Order No. 0036

Dear (b) (6)

We respectfully submit this RFI Final Report for five Solid Waste Management Units (SWMUs) at Fort Bliss identified within the above referenced delivery order. The Final Report is contained in three volumes: Volume 1 includes the narrative report; Volume 2 contains Appendices 1 through 10; and, Volume 3 consists of Appendix 11, Analytical Laboratory Reports. The comments of Fort Bliss and those of the Fort Worth District, U.S. Army Corps of Engineers, on the Draft Final Report have been addressed in the Final Report documents.

Thank you very much for your assistance in producing this RFI Final Report. Please contact (b) (6) or me at (b) (6) if you have any questions regarding these documents.

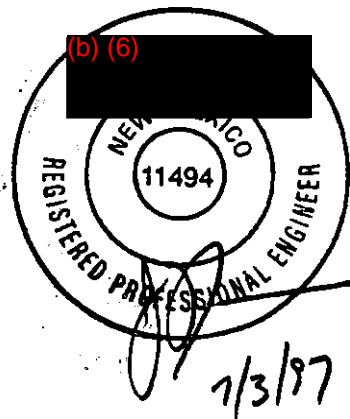
Very truly yours,

(b) (6)

President

JAL:eb

pc: F867-02.06  
JFT File



**RCRA FACILITY INVESTIGATION**

**FOR**

**FIVE SOLID WASTE MANAGEMENT UNITS**

**FORT BLISS, TEXAS  
AND NEW MEXICO**

**FINAL REPORT**

**July 1997**



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## LIST OF ACRONYMS

AAS	Atomic Absorption Spectroscopy
ANSI	American National Standard Institute
ASTM	American Society for Testing and Materials
BLM	Bureau of Land Management
CAS	Chemical Abstracts Service
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CQAR	Chemical Quality Assurance Report
DCQAP	Data Collection and Quality Assurance Plan
DO	Dissolved Oxygen
DOT	Department of Transportation
EB	Equipment Blank
EM	Electromagnetics
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESE	Environmental Science & Engineering, Inc.
FTBL	Fort Bliss
GC/MS	Gas Chromatograph/Mass Spectrometer
GIS	Geographic Information System
GPM	Gallons per Minute
GPR	Ground Penetrating Radar
GPS	Global Positioning System
H <sub>2</sub> S	Hydrogen Sulfide
HCL	Hydrochloric Acid
HPLC	High Performance Liquid Chromatography
HTRW	Hazardous Toxic and Radioactive Waste
ICP	Inductively Coupled Plasma Atomic Emission Spectrometry
LCS/LCSD	Laboratory Control Standard/Laboratory Control Standard Duplicate
LEL-LFL	Lower Explosive Limit - Lower Flammable Limit
MDL	Method Detection Limit
µg/Kg	Micrograms per Kilogram
mg/Kg	Milligrams per Kilogram
MRD	Missouri River Division
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MUC	Maximum Use Concentration
NMED	New Mexico Environmental Department
NMSWMR	New Mexico Solid Waste Management Regulations
NO <sub>3</sub>	Nitrate
O <sub>2</sub>	Oxygen
OEW	Ordnance and Explosive Waste
PARCC	Precision, Accuracy, Representatives, Completeness, and Comparability

PCB	Polychlorinated Biphenyls
PID	Photo-Ionization Detector
PPM	Parts per Million
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QCO	Quality Control Officer
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RPD	Relative Percent Difference
SCS	Soil Conservation Service
SLOP	Standard Laboratory Operating Procedure
SSHO	Site Safety and Health Officer
SSHP	Site-Specific Safety and Health Plan
STB	Supertropical Bleach
SVOC	Semi-Volatile Organic Compounds
SWDL	U.S. Army Corps of Engineers Southwestern Division Laboratory
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TD	Total Depth
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Service
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WSMR	White Sands Missile Range

## **1. Introduction**

## 1. INTRODUCTION

### 1.1. Purpose and Objectives of the RFI

Thompson Professional Group, Inc. of Houston, Texas, (Thompson) was retained by the United States Army Corps of Engineers (USACE), Fort Worth District, under Contract No. DACA63-94-D-0009, Delivery Order No. 0036, to conduct a Resource Conservation and Recovery Act (RCRA) Facility Investigation of five Solid Waste Management Units (SWMUs) at the Fort Bliss Military Reservation in New Mexico. The purpose of the investigation, as described in the contract Statement of Work, Task 2, and expressed in the RCRA Facility Investigation (RFI) Workplan, is to reasonably determine whether hazardous waste and/or hazardous constituents have been released to the environment at any of the sites, and if so, to evaluate the nature and extent of that contamination, and to assess the potential risk posed by such contamination to the public health and to the environment.<sup>1,2</sup>

In order to accomplish the goal of the RFI, a logical progression of investigative objectives would need to be satisfied. First, the areal extents and depths of the waste trenches at the four rubble pit/landfill SWMUs, and the locations and extents of the detonation pits at the inactive open detonation area, would need to be determined and mapped. Second, employing the information generated from the first objective, soil gases extracted from the entrenched waste masses at the four rubble pit/landfill sites would be analyzed as an indicator of the presence and relative concentrations of any volatile or semi-volatile organic contaminants. Third, using the data resulting from the soil gas sampling program to identify potential "hot spots" (i.e., in areas of specific VOC and SVOC concentrations) in the waste trenches, an observation trench would be excavated into a waste mass at each of the four rubble pits/landfills to characterize the types of wastes buried in the trenches and to confirm previously generated data on trench

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<sup>1</sup> U.S. Army Corps of Engineers, Fort Worth District, Statement of Work, RFI Workplan and Investigations, Fort Bliss, Contract No. DACA63-94-0009, Delivery Order No. 0026, Fort Worth, Texas, September, 1995.

<sup>2</sup> Thompson Professional Group, Inc., RCRA Facility Investigation Workplan for Nine Solid Waste Management Units, Fort Bliss, Texas, Houston, Texas, July, 1996.

depth and cover thickness. Fourth, depending on the nature of the site, surface and subsurface soil samples would be collected and submitted for laboratory analysis of potential contaminants. The probability of detecting contaminant releases would be optimized by applying the results of the first three investigative activities in selecting the locations for soil sampling. Therefore, sampling would be directed at locations most likely to produce positive results, rather than in a random distribution across a site.

Geotechnical soil samples would also be recovered from the soil borings in order to delineate the lithology and determine the properties of the soils at the five sites. Geotechnical soil samples of the waste trench covers at the four rubble pit/landfill sites would be collected and submitted for analysis to determine the properties of these soil covers. Information generated from the geotechnical analysis of the trench covers and surface soils would be used in conjunction with other relevant data to evaluate the potential for erosion at the four rubble pit/landfill sites.

Additionally, Thompson was tasked with constructing permanent bench mark monuments at the five sites included in this Report and at four additional sites that were incorporated into the RFI Workplan but were not included in Thompson's investigative scope for Task 2. Following construction, the monuments were to be surveyed and identified with the New Mexico State Plane Coordinate System for future reference.

To establish and maintain a safe work environment for conducting the RFI, Unexploded Ordnance (UXO) specialists would survey the five sites prior to the commencement of the investigative activities, and would remain on-site until the conclusion of all intrusive procedures. In addition, the health and safety guidelines presented in Section 7 of the RFI Workplan would be adhered to during the course of all field operations.

Finally, all tasks and activities associated with Task 2 of the RFI would be conducted in a manner consistent with the following U.S. Environmental Protection Agency (EPA) guidance documents: RCRA Facility Investigation Guidance Document; RCRA Groundwater Monitoring Technical Enforcement Guidance Document; and Test Methods for Evaluating

Solid Waste. Furthermore, the investigation would be performed to comply with the New Mexico Environmental Department (NMED), the EPA RCRA permit (EPA ID No. NM42113720101) as defined in Module V for this facility, and section 3004(u) of the RCRA as amended by the Hazardous and Solid Waste Amendments of 1984.

## 1.2. Facility Description

The five SWMUs to be investigated under Task 2 are located on three separate range camps within the Fort Bliss Military Reservation in the State of New Mexico. The SWMUs are basically oriented in three clusters: SWMUs 18 and 20 are located in the McGregor Range Camp area; SWMUs 27 and 29 are located in the Doña Ana Range Camp vicinity; and SWMU 25 is located in the Orogrande Range Camp area. Four of the SWMUs are rubble pits/landfills, while SWMU 20 is an inactive open detonation area. A Vicinity Map (Figure 1-1) indicating the general geographic location of these five SWMUs is included on the following page. Also depicted on this map are the locations of the four SWMUs where bench mark monuments were constructed and incorporated into the state plane coordinate survey.

The Fort Bliss Military Reservation is owned and operated by the United States Government and is considered federal land. McGregor Range is Bureau of Land Management (BLM) property that has been withdrawn from the public domain for military use until the year 2000. Land use and ownership maps (Figures 1-2, 1-3 and 1-4) are included at the end of this section. Maps indicating more detailed topographic features are included in Section 4 with the discussions of the individual SWMU investigations along with the aerial photographs and the investigative activity maps.

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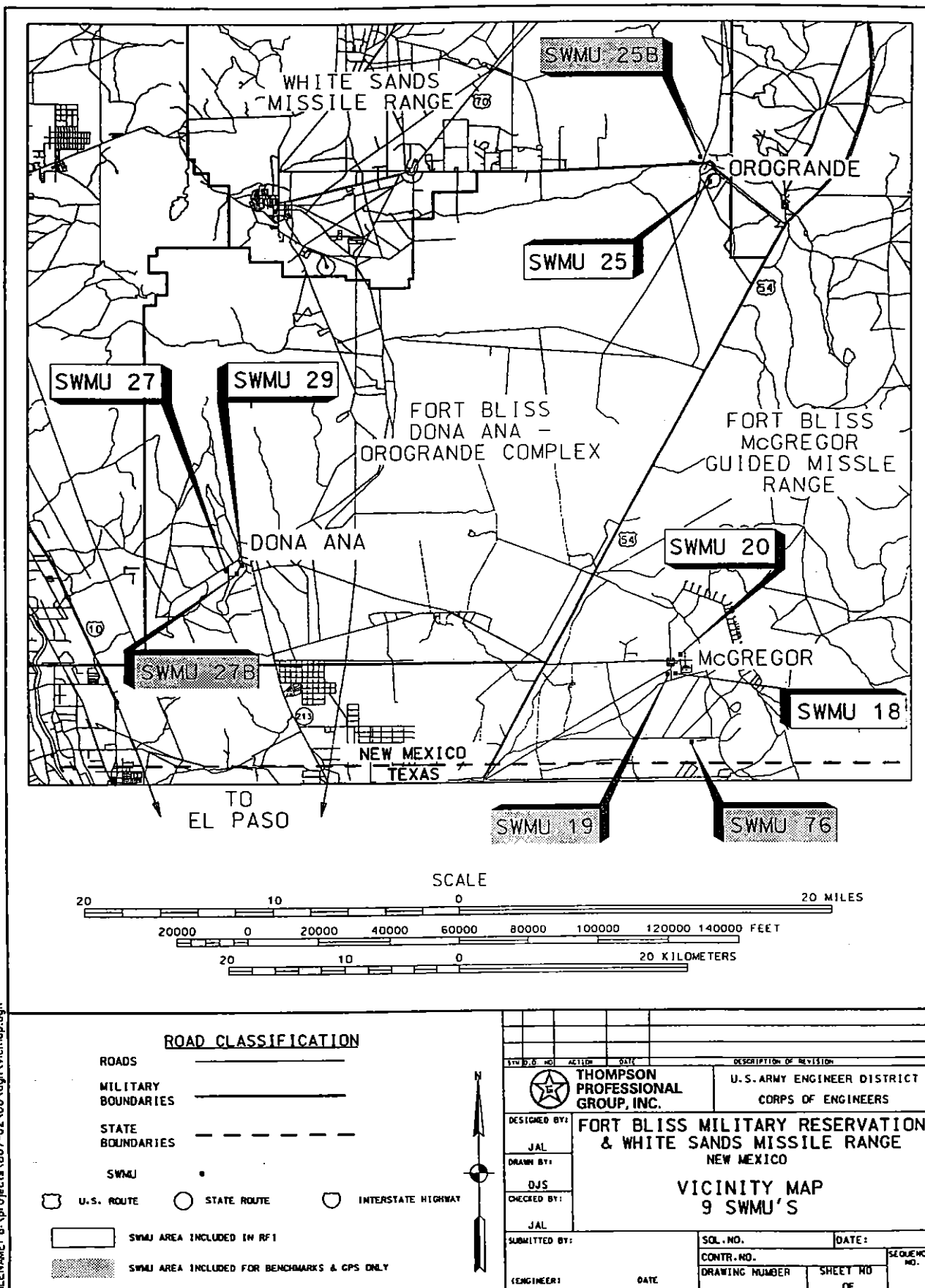


Figure 1-1  
 Section 1 - Page 4

The SWMUs involved in this investigation are managed and operated by the U.S. Army at Fort Bliss, and are identified throughout this RFI Report as follows (note that the SWMUs identified with an asterisk [\*] are included solely for the purpose of bench mark construction and coordinate survey):

<u>SWMU</u>	<u>DESCRIPTION</u>
18	McGregor Range Rubble Pit/Landfill - Inactive
19*	McGregor Range Oxidation Pond - Active
20	McGregor Range Open Detonation Area - Inactive
25	Orogrande Range Rubble Pit/Landfill - Inactive
25B*	Orogrande Range Oxidation Pond - Active
27	Doña Ana Rubble Pit/Landfill - Inactive
27B*	Doña Ana Range Oxidation Pond - Partially Active
29	Doña Ana Range Sanitary Landfill - Inactive
76*	Meyer Range Oxidation Pond - Partially Active. <sup>3</sup>

Eight of the nine SWMUs are located on the Fort Bliss Military Reservation while SWMU 25B is located on White Sands Missile Range.

### 1.3. Background

The Fort Bliss Military Reservation operates these SWMUs for the United States Government and the U.S. Army. The Army utilizes the range camp areas for personnel training and other defense purposes. As a result of the daily operation and personnel occupancy, the SWMUs were constructed as disposal facilities for solid waste, sanitary waste, rubble, and other waste generated by the Army personnel, maintenance, and other operations. Some of the rubble pits/landfills were constructed and used since World War II; however, the rubble pits/landfills and the detonation area are currently inactive.

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<sup>3</sup> RFI Workplan - Statement of Work dated September 1995.

#### 1.4. Summary of Previous Investigations

Fort Bliss obtained their RCRA permit on July 8, 1995. There have been some previous site investigations performed for some of the SWMUs in the area. Details of the previous site investigations are discussed under each individual SWMU as it pertains to that site. The following is a list of studies that were completed and submitted to the NMED and EPA:<sup>4</sup>

1. United States Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD, Final Report, Evaluation of Solid Waste Management Units, Fort Bliss, Texas, 3-7 August 1987 and 26-29 September 1989.
2. A.T. Kearney, Inc., RCRA Facility Assessment PR/VSI Report, (PR/VSI stands for Preliminary Review/Visual Site Inspection) March 1989.
3. Earth Science Corporation, Environmental Compliance Assessment Report, April 1993.

Hazardous wastes are reported as having been generated from approximately twenty different organizations through the 1.2 million acres that comprise Fort Bliss.<sup>5</sup> The largest quantities of such wastes include solvents, battery acid and STB (Supertropical Bleach, a substance used to decontaminate equipment). Other hazardous wastes reported as having been generated in smaller quantities include methanol, formaldehyde, xylene, paints and thinners, and chromic acid rinse water. It is not known for certain which, if any, of the five SWMUs involved in this investigation contain any one or more of these substances or any other hazardous substances. No interim measures or corrective actions have been implemented at any of the SWMUs.

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<sup>4</sup> Statement of Work

<sup>5</sup> U.S. Environmental Protection Agency, Region VI, Houston Branch, RCRA Compliance Inspection Report of Fort Bliss, Texas, Houston, Texas, March 29, 1988.

### 1.5. RFI Report Format

The remainder of this RFI Report is divided into five major sections. Section 2, Environmental Setting, provides general information on the geology, hydrogeology, physiography, and other pertinent natural characteristics of the Fort Bliss Military Reservation and White Sands Missile Range area. An explanation of the field methods and procedures used to conduct the RFI are discussed in generic terms in Section 3, Field Data Collection Methods. The characterization of the individual SWMU sites, including the site-specific presentation of the results of the field investigation, is detailed in Section 4, Characterization of SWMUs. Also included in Section 4 is a discussion of the data evaluation methods. Section 5, Summary and Conclusions, presents a summary of the findings of the investigation and an assessment of the impact of these findings. Recommendations for further investigative activities relative to individual SWMU sites are detailed in Section 6, Recommendations. Supporting documentation from the investigation is presented in the Appendices.

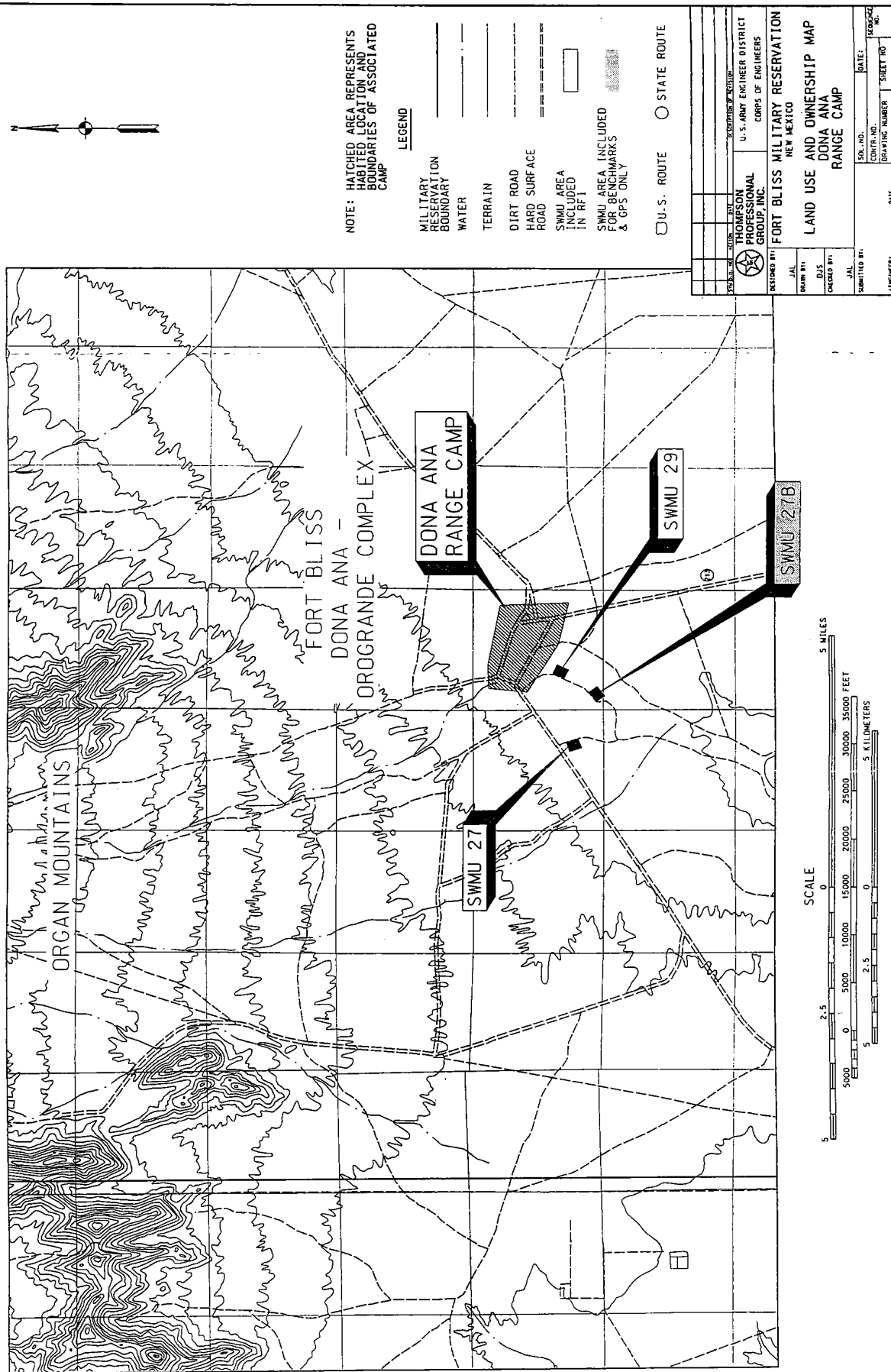
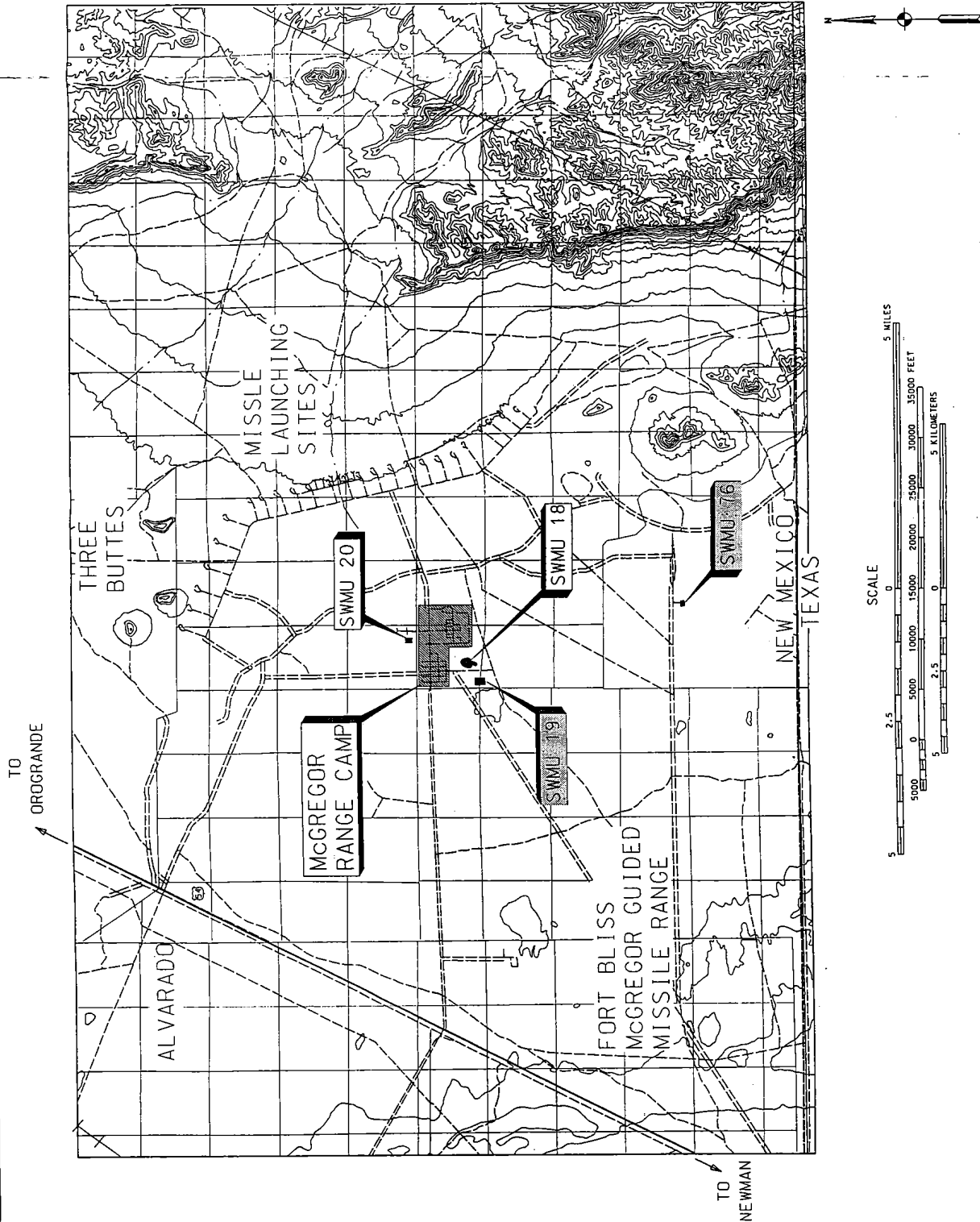


Figure 1-2  
Section 1 - Page 8



NOTE: HATCHED AREA REPRESENTS  
HABITED LOCATION AND  
BOUNDARIES OF ASSOCIATED  
CAMP

LEGEND

- MILITARY BOUNDARY
- STATE BOUNDARY
- RAILROAD
- WATER
- TERRAIN
- DIRT ROAD
- HARD SURFACE ROAD
- SWMU AREA INCLUDED IN RT-1
- SWMU AREA INCLUDED FOR BENCHMARKS & OPS ONLY
- U.S. ROUTE
- STATE ROUTE

THOMSON PROFESSIONAL GROUP, INC.		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW MEXICO	
DESIGNED BY: JAL		DRAWN BY: DLS	
CHECKED BY: JAL		SUBMITTED BY: JAL	
DATE:		DATE:	
SHEET NO. OF		SHEET NO. OF	
CONTRACT NUMBER		CONTRACT NUMBER	
DATE		DATE	
ENGINEER		ENGINEER	

**LAND USE AND OWNERSHIP MAP**  
**MCGREGOR/MEYER**  
**RANGE CAMPS**

Figure 1-3  
Section 1 - Page 9

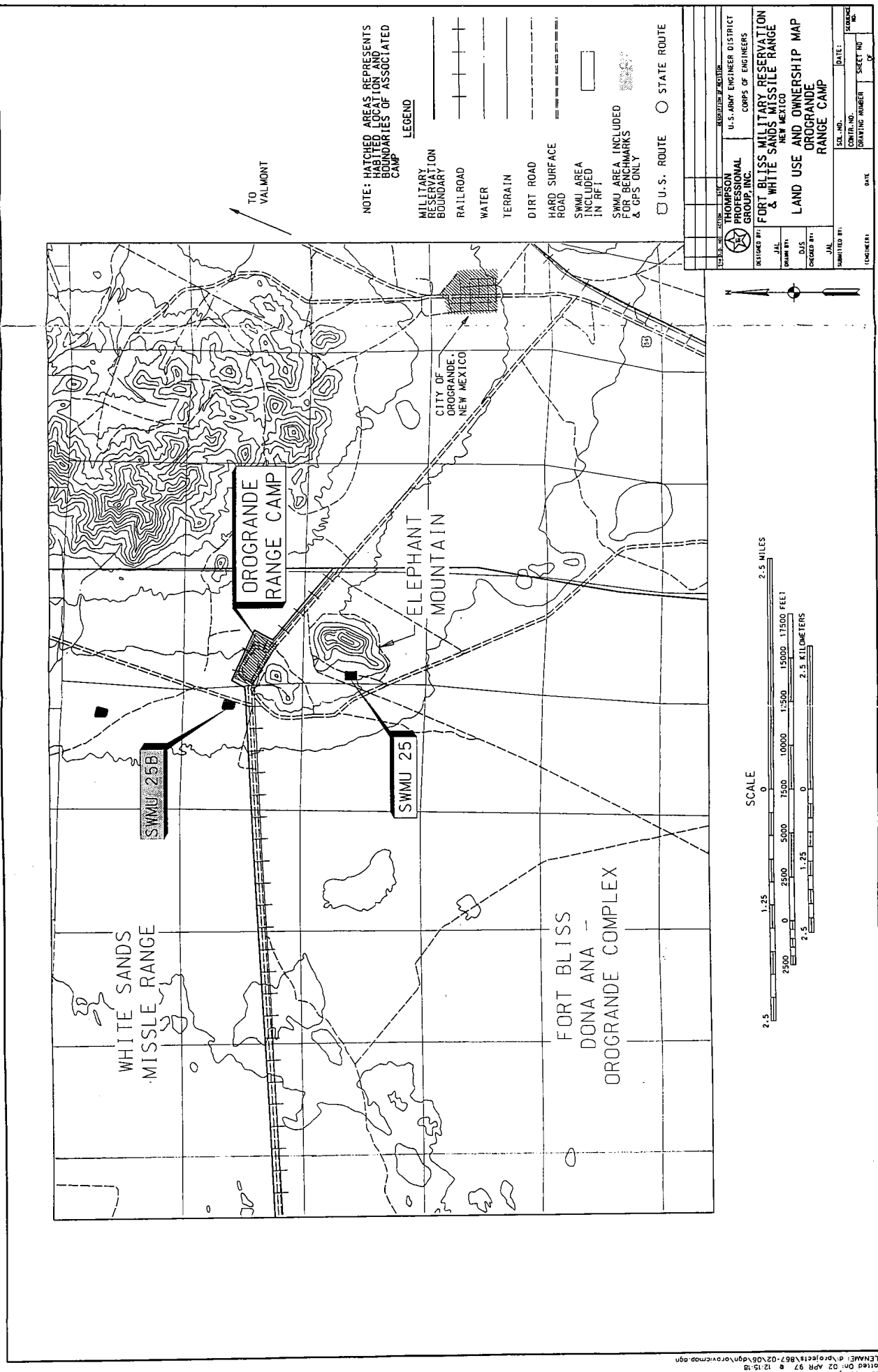


Figure 1-4  
Section 1 - Page 10

**2. Environmental  
Setting**

## 2. ENVIRONMENTAL SETTING

### 2.1. Regional Geology and Physiography

A review of geologic and hydrogeologic references indicates that region encompassing the Fort Bliss Military Reservation is located within the Tularosa and Hueco Basins of the New Mexico Highland section of the Basin and Range province.<sup>6, 7</sup> These elongated basins are surrounded by the Sacramento and Hueco Mountains to the east and the San Andres-Organ-Franklin Mountain chain to the west, as depicted on the GIS basemap (Figure 2-1) which is located on the following page. Maximum elevations are 1,727 meters (5,666 feet) above mean sea level (m-msl) in the Hueco Mountains and 2,606 m-msl (8,550 feet) in the Organ Mountains. Valley elevations range from 1,273 meters (4,177 feet) in the east to 1,197 meters (3,927 feet) in the west. The basin is nearly level to gently rolling, and consists of shallow ephemeral lake beds, alluvial plains, and low sand dunes. The distribution of the mountains and basin fill controls the hydrologic and hydrogeologic conditions in the basins, and therefore, controls hydrogeologic settings in this region.

### 2.2. Regional Hydrogeology

Although a significant amount of hydrogeologic information is available concerning the region in which the Fort Bliss Military Reservation is located, site-specific data is limited.

#### 2.2.1. Geologic Framework

Geologic materials in the study area can be divided into consolidated and unconsolidated rocks, according to their water-bearing characteristics. Consolidated

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<sup>6</sup> Machette, M.N., Preliminary Assessment of Paleoseismicity at White Sands Missile Range, Southern New Mexico, U.S.G.S. Open-File Report 87-444, Denver, Colorado, 1987.

<sup>7</sup> King, W.E., Hawley, J.W., Taylor, A. M. and Wilson, R.P., Geology and Ground-Water Resources of Central and Western Doña Ana County, New Mexico, New Mexico State Bureau of Mines and Mineral Resources Hydrologic Report 1, Socorro, New Mexico, 1971.

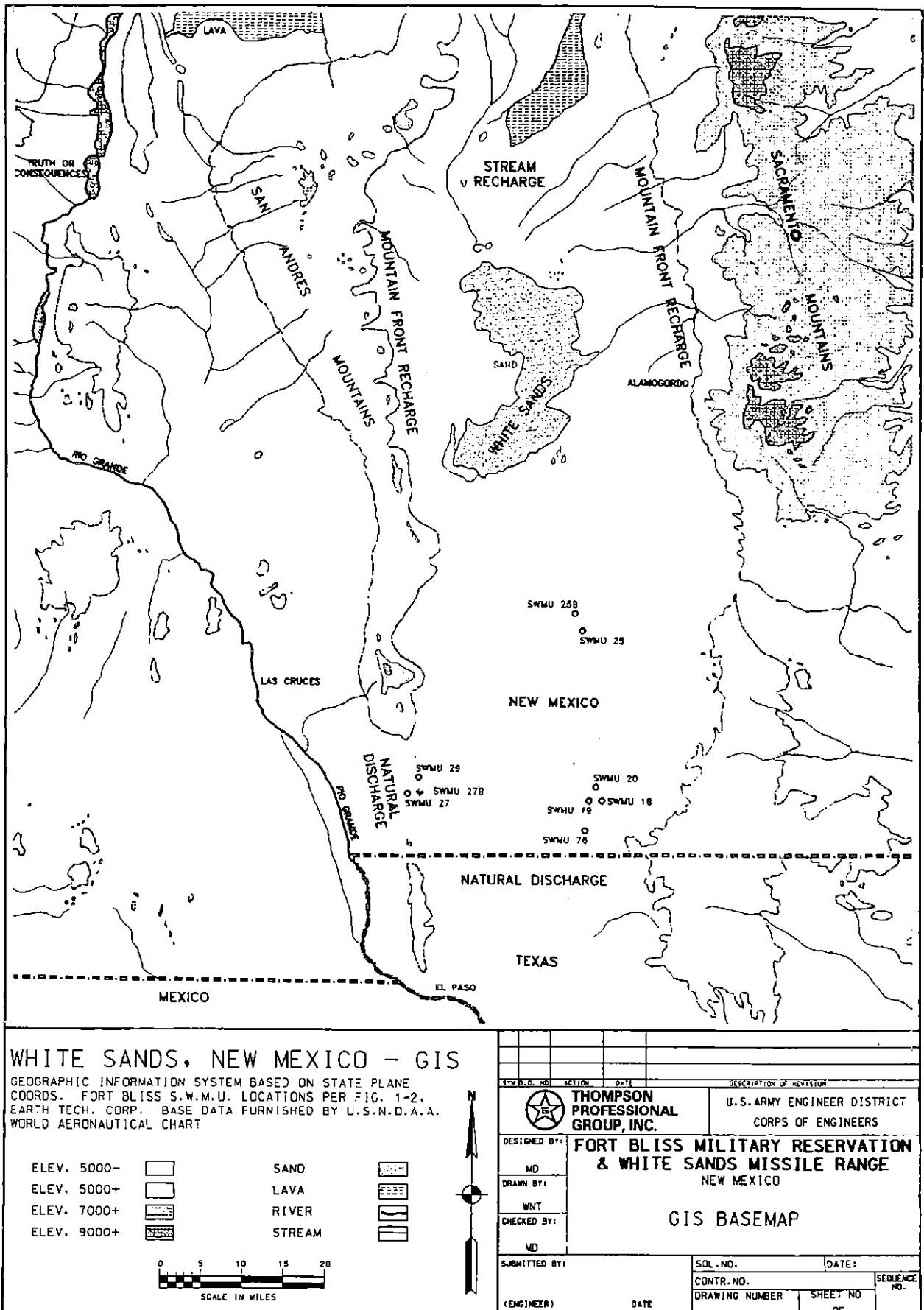


Figure 2-1  
 Section 2 - Page 2

rocks in the study area consist of granite, metamorphic, igneous, and sedimentary rocks.<sup>8</sup> The consolidated rocks form the core of the hardrock mountains and the bedrock units underlying the basin fill. With the exception of a few locally-fractured or highly-weathered zones, consolidated rocks store and transmit insignificant amounts of water on the regional scale. They provide an effective no-flow barrier for the regional groundwater flow system. Unconsolidated sand, gravel, silt and clay comprise the basin fill in the study area.<sup>9</sup> The thickness of the basin fill is estimated to range from zero to more than eight thousand feet in the region which includes the Fort Bliss Military Reservation.<sup>10</sup> The basin fill contains the primary hydrogeologic units that are probable pathways for groundwater movement and contaminant migration.

### 2.2.2. Hydrologic Condition

There are no major streams or surface water bodies located within, or immediately adjacent to, the Fort Bliss Military Reservation. Average precipitation rates are less than 10 inches per year.<sup>11</sup> Annual evaporation rates are estimated to exceed 90 inches.<sup>12</sup> Therefore, natural groundwater recharge will occur only along the mountain front and in the basin floor areas where the surface materials are extremely coarse permitting rapid infiltration.

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<sup>8</sup> Herrick, E.H., Conservation of Floodwater at White Sands Missile Range Doña Ana County, New Mexico, U.S.G.S. Hydrologic Investigations Atlas HA-42, Washington D.C., 1961.

<sup>9</sup> Myers, R.G. and Pinckley, K.M., Test Wells T23, T29, and T30, White Sands Missile Range and Fort Bliss Military Reservation, Doña Ana County, New Mexico, U.S.G.S. Open-File Report 84-805, Albuquerque, New Mexico, 1985.

<sup>10</sup> Orr, B.R. and Risser, D.W., Geohydrology and Potential Effects of Development of Freshwater Resources in the Northern Part of the Hueco Bolson, Doña Ana and Otero Counties, New Mexico, and El Paso County, Texas, U.S.G.S. Water-Resources Investigations Report 91-4082, Albuquerque, New Mexico, 1992.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

The evaluation of hydrologic conditions in this area indicates that there is no direct natural discharge of the groundwater to a surface-water body, (except possibly the Rio Grande, south and west of the Fort Bliss Military Reservation). Any significant amounts of groundwater discharge from the regional groundwater-flow system in this area are probably due to withdrawals through pumping wells. Groundwater recharge or discharge can also occur along the permeable boundaries of the regional groundwater-flow system adjacent to the Basin Region.

#### 2.2.3. Groundwater Potentiometric Surfaces

The Las Cruces, New Mexico, office of the USGS was contacted to obtain the most recent information available of published reports of groundwater well measurements conducted by the USGS in the vicinity of the SWMU sites. The requested areas of interest were limited to a one mile radius from each of the three range camps, in the vicinity of which the five SWMUs are located. The USGS responded that their office had no information on groundwater wells within the requested areas.

The Fort Bliss Directorate of Public Works reports that two potable water production wells are currently serving the Doña Ana Range Camp. Both wells are located within approximately one-half mile of the Range Camp. The approximate depth to water level is 380 feet for both of these wells. More information on these wells is presented in Subsection 4.5.8. which discusses potential contaminant receptors in the vicinity of the Range Camp.

#### 2.2.4. Human Impacts on Hydrogeologic Conditions

The most significant manmade impact on hydrogeologic conditions in this area is likely caused by groundwater withdrawals from the regional groundwater system. Heavy groundwater withdrawals have occurred in the WSMR area of New Mexico.<sup>13</sup> Review

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<sup>13</sup> Cruz, R.R., Annual Water-Resources Review, White Sands Missile Range, New Mexico, 1984, U.S.G.S. Open-File Report 85-645, Albuquerque, New Mexico, 1985.

of historical water-level data reveals both seasonal fluctuations and continued long-term declines in groundwater levels in the WSMR area.<sup>14</sup> WSMR is located adjacent to the Fort Bliss Military Reservation and is part of the same regional groundwater flow system as the Fort Bliss Military Reservation.

### 2.3. Other Regional Characteristics

Currently, the basin fill in the study area is probably saturated below the depths of approximately 300 feet.<sup>15</sup> Therefore, the thick soil and vadose zone play important roles in contaminant migration in the subsurface of the area encompassing the Fort Bliss Military Reservation.<sup>16, 17</sup>

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<sup>14</sup> Ibid.

<sup>15</sup> Myers, R.G. and Pinckley, K.M., Test Wells T23, T29, and T30, White Sands Missile Range and Fort Bliss Military Reservation, Doña Ana County, New Mexico, U.S.G.S. Open-File Report 84-805, Albuquerque, New Mexico, 1985.

<sup>16</sup> Wilson, L., Potential for Ground-Water Pollution in New Mexico, New Mexico Geological Society, Special Publication No. 10, Albuquerque, New Mexico, 1981, Pages 47-54.

<sup>17</sup> Longmire, P.A. and Gallaher, B.M., Geological, Geochemical, and Hydrological Criteria for Disposal of Hazardous Wastes in New Mexico, New Mexico Geological Society, Special Publication No. 10, Albuquerque, New Mexico, 1981, Pages 93-102.

**3. Field Data Collection  
Methods**

### **3. FIELD DATA COLLECTION METHODS**

Implementation of the RFI Workplan began on September 30, 1996 with construction of the geophysical survey grid at SWMU 18. The plan for field data collection at the five SWMUs was to proceed logically through a series of investigative activities with the results obtained from each sequential activity guiding the direction of the succeeding activities in the series. The activities, and the sequence in which they were conducted, were UXO clearance, geophysical survey including survey grid construction, bench mark monument construction and GPS survey, soil gas survey, trench excavation, and soil sampling. With the exception of the trench excavation and soil gas survey that were not relevant to the investigation of SWMU 20, all of these activities were conducted at each site. Although the UXO clearance activity was conducted primarily for safety reasons, some sampling data was derived from this function and a brief description of the collection methodology appears in the following discussion. Each of the following subsections describes a data collection activity in general terms. The application of each activity to a particular SWMU is described in Section 4. Photographs of these activities being performed are included in Appendix 1, Photographic Documentation.

#### **3.1. UXO Clearance**

Based on information that the soils at SWMUs 20 and 27 might be contaminated with explosive materials, the Workplan for this investigation mandated that these two sites be investigated by personnel qualified in UXO site clearance procedures prior to the initiation of any other investigative activity. CMS Environmental, Inc. of Tampa, Florida was retained by Thompson to conduct all UXO-related activities during the RFI. Clearance activity at each of the two sites consisted of a visual inspection of the site and soil sampling for explosive reactivity to confirm that the explosives content of the soil was below the safety ceiling of 10% by weight. A D TECH<sup>®</sup> Explosives Field Test Kit, calibrated specifically to detect TNT and RDX, was used by the UXO team to sample surface soils for explosive content. None of the soil samples tested reflected an explosives content greater than the 10% limit. The results of the field sample analyses are included in the reports on SWMUs 20 and 27 in Section 4, information on

the D TECH™ Explosives Field Test Kit is included in Appendix 7 of this Report, and detailed procedures for UXO site clearance may be referenced in Appendix 2 of the RFI Workplan.

### 3.2. Geophysical Survey

A review of historical documents, augmented by interviews with Fort Bliss personnel and visual inspections by Thompson personnel, conducted during preparation of the Workplan for this RFI, resulted in only a general concept of the locations of waste trenches at the four rubble pit/landfill sites. As such, the first step in the logical progression of the investigative process was to determine the exact location of the trenches at these sites. Golder Associates of Redmond, Washington, was retained to conduct a geophysical survey of the sites to determine the locations, areal extents and depths of the waste trenches, and also to locate the positions and depths of any anomalous buried objects such as metal drums. Golder Associates was also tasked with conducting a limited geophysical survey at a fifth site, SWMU 20, which is an inactive open detonation area, for the purpose of locating any buried anomalous objects. Additionally, the geophysical surveys of the five sites could produce information on soil and rock characteristics, and locate and map any existing zones of contaminated soil or groundwater.

The surveys were supported by personnel from Thompson who established ground control by constructing the survey grids to specifications provided by the Golder team. The grid layout used at each site varied depending on the individual characteristics of the site and the capabilities of the equipment being used. In general, survey transects were constructed perpendicular to the suspected orientation of the waste trenches and spaced at 50 feet intervals with grid nodes erected every 100 feet along transect lines. The grid nodes were identified with survey laths or spikes, flagged, and labeled with the established local grid coordinates. The origin of each grid was tied to the permanent bench mark monuments constructed by Thompson at each site during RFI field work. Information on the construction of site-specific grids may be located in Section 4 of this Report. The survey grids were expanded during the

course of the geophysical investigation when the results of the survey indicated that a previously unexplored area might contain waste deposits.

Multiple geophysical methods were selected for use at the sites. These methods are non-destructive, non-invasive, in-situ applications that measure the physical, electrical, and geochemical properties of the soil and rock matrix. Each method has certain advantages and disadvantages, strengths and weaknesses, as a detection and mapping agent. By employing multiple methods, the advantages and strengths of each can be used to compensate for the disadvantages and weaknesses of the others. When the results generated by application of each survey method were reviewed, analyzed, and interpreted in conjunction with the results of the other methods applied at the site, a clearer and more accurate assessment of the subsurface environment emerged than if only a single geophysical method was applied. The different geophysical methods used for the site survey investigations are described in the following subsections. For a complete description of these methods and the manner in which they were applied at specific sites, refer to the Final Report from Golder Associates included as Appendix 2 to this Report.

Following the completion of the geophysical survey at each site, a tentative site map was produced which indicated the location, referenced to the control grid, of the detected waste trenches and other pertinent features of the site. This map was used for locating sampling points during subsequent investigative activities.

#### 3.2.1. Frequency-Domain Electromagnetics

Frequency-domain electromagnetic (EM) induction measures the electrical properties of the subsurface environment by recording the magnitude of electrical currents induced within the subsurface. By continuously recording the variations in these induced currents while traversing a transect line, changes in surface and subsurface conductivity may be detected and mapped. These variations in conductivity may be related to changes in lithology, variations in water content, or the presence of contaminants and

buried debris. Frequency domain EM induction provides an excellent method for “profiling” (i.e., detecting and mapping lateral variations in subsurface conductivity).

A Geonics EM-31 terrain conductivity meter was used to measure subsurface electrical conductivity at the sites. This device can be effective to a depth of 15 to 18 feet depending on soil type. The instrument consists of a 12-foot long boom that contains a transmitter on one end and a receiver on the opposite end. As the operator geophysicist walks with the boom along a transect line across a site, the transmitter creates an electromagnetic field which induces eddy currents in the subsurface. The eddy currents then produce a secondary electromagnetic field. Both of these electromagnetic fields are detected by the receiver. The data generated by this process was recorded on an OmniData Model 720 polycorder which was downloaded nightly following the daily survey activity. The data were processed and plotted as a contour map which represents the changes in conductivity over the surveyed site. The contour map was analyzed by a qualified geophysicist and any necessary adjustments, as indicated by these results, were made to the survey plan for the following day.

### 3.2.2. Ground Penetrating Radar

Ground Penetrating Radar (GPR) uses pulses of high frequency electromagnetic waves radiated into the subsurface to detect changes in electrical conductivity between two materials. The continuous application of this method along a transect line can provide a vertical profile of subsurface materials. GPR was selected for use as part of this geophysical investigation for the purpose of determining the depths and confirming the lateral extents of the waste trenches. GPR may also be used to locate buried objects, map the depth to a shallow water table, to delineate soil horizons, bedrock subsurface and structure. The depth of penetration of GPR is greatest in coarse, dry, sandy soils, and may be significantly reduced in fine-grained, wet, clayey materials.

The geophysical team, assisted by a Thompson field technician, used a GSSI SIR System-8 with a 120 MHz antenna to conduct the GPR survey. This system consisted

of a fiberglass box containing the antenna that was connected by a cable to a data processor and displayed on an EPC Model 8700 thermal graphic recorder. As the antenna was pulled along a selected transect line, it transmitted a radar pulse into the ground for every 4 to 6 inches of travel. These pulses were reflected from subsurface features and the resulting reflections were plotted in real time on a graphic recorder. GPR was only used along certain transects to determine waste trench depth following the evaluation of data produced by the EM and magnetometry surveys. The velocity of the radar waves is influenced by the type of material that the waves are traveling through. By assuming a velocity based on the type of soil being penetrated, the depth to wave reflection may be calculated from the recorded wave velocity. Since the velocity data is recorded continuously as the antenna is towed along a transect, a vertical profile of the waste trench could be produced.

### 3.2.3. Magnetometry

Magnetometers are instruments that measure variations in the earth's magnetic field produced by the presence of ferrous materials, such as buried drums or other metallic debris. A gradiometer is a type of magnetometer that consists of two magnetic sensors separated by a distance of 3 to 6 feet. While a total field magnetometer measures the total magnetic field of the earth, the gradiometer responds only to the difference in the two measured magnetic fields. By operating in this manner, the gradiometer is insensitive to natural changes in the earth's magnetic field.

A GEM Systems Model GSM-19, configured as a horizontal gradiometer, was used for this portion of the geophysical survey. The data generated with the GSM-19 were recorded on a digital acquisition system, processed, and displayed as a contour map of magnetic intensity. By recording the response of the gradiometer on a continuous basis along the same survey transects covered by the EM-31, the resulting two contour maps could be compared to establish and confirm the extents of the waste trenches. Knowledge of the distribution of ferrous materials gained through use of the

gradiometer provided guidance in differentiating highly conductive zones, identified with the EM-31, that were due to the presence of conductive soils or non-ferrous conductors from those zones containing ferrous materials.

### 3.3. Global Positioning System Satellite Surveying

The Workplan for this RFI tasked Thompson with constructing permanent bench mark monuments for horizontal and vertical control at all nine SWMU sites that were included in the Workplan. Thompson utilized the Global Positioning System (GPS) satellite surveying technique to tie these bench marks to the New Mexico State Plane Coordinate System. This technique uses radio signals from satellites orbiting the earth at an altitude of approximately 20,000 kilometers (12,000 miles). The signals are “picked up” by receivers positioned at the bench marks for a specified time period. The data is then downloaded from the receivers and processed to obtain the horizontal and vertical position.

At each site two monuments with brass caps were constructed. Each monument was constructed of a 3-foot x 5/8-inch iron rod driven into the ground with the top 12 inches of the rod surrounded by a 12-inch diameter slab of concrete. A 3-inch diameter brass cap was placed on top of the rod, level with the concrete surface. After the concrete set, the “caps” were center punched and stamped “Bench Mark (SWMU #) BM # (1,2), ELEV, 1993 ADJ.” The monuments were positioned with bench mark (BM) number one adjacent to the site and BM 2 placed at least 1,500 feet away. Two BM’s were used at each site to establish an “azimuth line” for orientation purposes. The azimuth and distance were chosen to facilitate the overall GPS network geometry. Each BM was further tied to physical monuments such as water tanks, mountain tops, and buildings with angular measurements from the azimuth line. The monuments were constructed to be used as permanent reference marks to be tied into the North American Datum of 1983 (NAD 83). Three maps have been included at the end of Subsection 4.1.4. that illustrate the locations of the bench marks relative to the SWMU locations.

NAD 83 is an Earth-Centered Cartesian coordinate system (X,Y,Z) which can be converted to geodetic coordinates (latitude, longitude, and height) on the reference ellipsoid. This enables any interested party to accurately locate the sites on topographical maps covering the project area. To establish the coordinates on these bench marks, the GPS units receiving signals from the same satellites were placed over known National Geodetic Survey (NGS) monuments in the area at the same time other GPS units were on the bench marks. The observations, or vectors, are processed to obtain the components of the baseline vector between the known points and the bench marks.

Each time a set of observations is taken is called a session. Each session would cover known NGS monuments and bench marks at the various camp sites. Thompson ran eight to ten sessions a day for each camp area. The majority of the bench marks were "read" twice to ensure that coordinates generated for one session matched the coordinates of the same point calculated from another session. The GPS units used were Trimble Navigation 4000 series units which are primarily used for higher order (accuracy) surveys. All data was downloaded on a daily basis and processed using Trimble Baseline solution software. After the baselines were processed, they were included in an overall network adjustment. This network adjustment used the known positions of the NGS monuments and baseline vectors to calculate the positions of the new bench marks constructed by Thompson. Supporting documentation for the GPS survey is included as Appendix 4 in this Report.

### 3.4. Soil Gas Sampling

Utilizing the data obtained from the geophysical studies, a soil gas survey was conducted at each rubble pit/landfill. At least one soil gas sampling point was established for each waste trench, with additional sampling points in areas that were determined to be inconclusive by the geophysical studies. The method of the investigation was ASTM Method D 5314 - 92, *Soil Gas Monitoring in the Vadose Zone*. The soil gas survey results provided information on landfill gases present in the trenches, and to a lesser degree, the extent of any contamination.

Additionally, the results of this survey aided in the determination of the trench excavation locations. The testing of the soil gases was by the use of both field and laboratory techniques.

To ensure the safety of on-site personnel during the penetration of the probe into the rubble pit/landfill, an Unexploded Ordnance (UXO) team from CMS, Inc. examined the site to detect any munitions prior to intrusion into the rubble pit/landfill with the probe, and remained on-site for the duration of the sampling procedure. These personnel were also responsible for the initial penetration through the top soil at each sampling location.

The soil gas probe used in this investigation was an AMS Gas Vapor Probe. The probe consisted of a solid stainless steel retractable point connected to a hollow stainless steel drive shaft. A Teflon® tube provided the path to extract the gas from the soil. Due to the density of the soil, a six-inch steel soil auger was used to loosen the top three feet of soil at each sampling location, and then the probe was inserted manually to a depth below the trench cover as determined by the geophysical survey. The gases were sampled by applying a vacuum to the tube, and either directly analyzing the soil gas or collecting the gas in Tedlar bag for laboratory analysis. All of the samples were tested for the lower explosive limit (LEL), hydrogen sulfide, carbon monoxide, oxygen, and volatile organic compounds (VOCs) using direct reading instruments. The analysis of LEL, hydrogen sulfide, carbon monoxide, and oxygen were conducted with a Bacharach Sentinel 44 Gas Monitor. A MiniRAE Professional PID (photo-ionization detector) was employed to detect the presence of VOCs. In addition, if an elevated LEL or VOCs were detected, a sample of the soil gas was collected and analyzed by Southwest Laboratories of Oklahoma, utilizing EPA Method TO-14 for GC/MS determination of VOCs. The GC/MS analysis is able to differentiate and quantify the VOCs by individual constituent on a parts per billion (ppb) basis. The following table (Table 3-4-1) summarizes the soil-gas survey sampling event:

SWMU Number	Number of Trenches	Planned Number of Sampling Points	Actual Number of Sampling Points	Number of Laboratory Samples
18	11	24	24	5
25	1	10	4	1
27	7	10	19	2 + 1 Dup
29	NA	10	3	0

Table 3-4-1 - Soil Gas Sampling Schedule

The instruments were calibrated according to the manufacturers' instructions and applicable regulatory requirements, and the sample probe was decontaminated after each sample was taken (see Section 3.7). In addition, QA/QC was performed. An equipment blank was taken at the rate of one per day in which an ambient air sample was taken through decontaminated equipment, and these samples were analyzed utilizing the direct reading instruments discussed above. Equipment blanks measure the effectiveness of the decontamination procedure. In addition to the equipment blanks, sample duplicates were collected for laboratory analysis at the rate of one per every ten samples (10%). The on-site and laboratory analysis of the soil gas was conducted by personnel who are knowledgeable with the respective instrumentation.

### 3.5. Trench Excavation

Based on the data gathered from the geophysical investigations and soil gas surveys conducted at the four landfill/rubble pits, a single location was selected at each SWMU where an observation trench was excavated into the buried waste. The geophysical surveys provided information concerning the locations and extents of the waste trenches, while the soil gas surveys furnished data on potential sources of VOCs. The purpose of the trench excavation was primarily to inspect and categorize the trench cover and buried waste materials. The visual inspection of the waste materials was intended to provide information on whether hazardous materials are present in the landfills and to document the constituents of the waste.

Prior to initiating the excavation, each site was surveyed by qualified UXO personnel to determine the presence of any unexploded or unexpended ordnance to ensure the safety of on-site personnel during the excavation procedure. The UXO team remained on-site for the duration of the excavation to detect any buried munitions that might be present in the waste materials. Air monitoring of the excavation for combustible gases and volatile organic compounds was conducted continuously as the digging progressed.

D & H Pump Service, Inc. of El Paso, Texas, was retained by Thompson to excavate the trenches. Each trench was excavated with a John Deere 710 C backhoe in a manner that provided safety from trench wall collapse for persons descending into the excavation for the purpose of inspecting the waste mass. Each excavation was thoroughly inspected while ensuring protection for the geotechnical engineer examining the trenches by continuously monitoring the air in the excavation with a Bacharach Sentinel 44 Gas Monitor. When the excavation was completed, an exclusion zone was created by installing yellow barrier tape around the perimeter of the trench to prevent people who might enter the site from inadvertently falling into the excavation. The barrier was erected approximately 5 feet out from the edges of the excavation, with the tape being supported by iron rods driven into the ground.

As the excavation progressed, field notes were recorded identifying such items as the thickness and characteristics of the soil cover, the nature and encountered depths of the waste materials, and the ultimate depth of the waste trench in case the underlying soil layer was reached. The excavated materials were piled in mounds at the surface as they were removed from the trench with the backhoe, scanned with the air monitor and a PID to detect volatile emissions, and inspected by an environmental engineer who logged the depths and types of materials removed from the trench. The actual depths and lateral extents of the excavations varied depending on the dimensions of the waste mass being explored (see individual site discussions in Section 4). Groundwater was not encountered in the course of excavating any of the trenches.

Following a thorough inspection of the completed excavation and the extracted waste materials stockpiled at the surface, the previously removed contents were returned to the trench and recovered with backfill available at the site. The cover material was applied in lifts with intermittent compaction provided by the backhoe. When recovering was completed the exclusion zone barrier was disassembled, and the site was inspected to insure that all of the waste materials had been properly covered.

### 3.6. Soil Sampling

Utilizing the data from the geophysical and topographical surveys, the surface and subsurface sample locations were determined based on size, location and depths of the individual waste trenches as determined by the geophysical survey, and the surface conditions near the desired sample locations. Samples were collected at SWMUs 18, 20, 25 and 27. The combined results of the geophysical survey and the trenching excavations show that SWMU 29 does not exist in the area where previously thought, if it exists at all. Samples were collected for both chemical and geotechnical analysis. The chemical sampling and analysis were performed to determine if any contaminants exist, and if so, the extent of contamination. Geotechnical sampling and analysis was performed to derive information on the physical properties of the soil. With the information on the physical properties of the soil, the potential for the migration of any contaminants escaping the trenches can be determined.

Samples that underwent chemical analysis were collected using thoroughly decontaminated utensils (see Section 3.7), and all personnel in contact with the samples wore clean gloves which were changed between each sample to prevent cross contamination. All sample containers were provided by the contract laboratory, and were equipped with Teflon<sup>®</sup>-lined lids. Additionally, no metal lids were used on any containers housing samples for chemical analysis. Sample jars were clearly labeled and determined to be free of defects prior to collecting each sample.

Sample documentation was maintained to record sample possession and the handling of individual samples from the time of collection through the completion of laboratory analysis.

All pertinent information about each sample, i.e., assigning a unique sample identification number, date, location, sample depth, collection method, etc. was recorded using the following procedures:

- Sample labels with the unique sample identification number, name of the sampler, date and time of the sample collection, boring number, description of the matrix, and analyses requested, all in waterproof ink affixed to the sample jars.
- A chain-of-custody record to document sample possession from the time of collection through arrival at the laboratory. The information recorded on the chain-of-custody included sample identification numbers, time and date of the sample collection, type of sample container, matrix, analysis to be performed and the time dated signatures of all people in possession of the sample.
- Field notes and logbooks were used to record all activities involved with the sampling process. This information included weather conditions, boring number, sample number, odors, number and types of containers, date and time of collection, name of samplers, any unusual characteristics and explanations for deviations from the usual course of sampling events.
- Photographic documentation to record sampling events including locations, processes, equipment used and personnel on site.

The actual number of samples collected at each site deviated from the proposed number of samples as stated in the Workplan. These deviations were due to the results of the geophysical survey. If the geophysical survey showed that a site was smaller than originally anticipated, some of the borings were reassigned to a site that was larger than anticipated. This allowed for better characterization of the larger sites without sacrificing the due attention needed at smaller sites. The Analytical Sampling Schedule in Table 3-6-1 shows the suspected number of trenches, actual number of trenches, proposed number of samples and the actual number of samples collected at each SWMU.

SWMU Number	Trenches		Borings		Surface Samples	
	Proposed	Actual	Proposed	Actual	Proposed	Actual
18	10	12	7	9	0	0
20	0	0	2	2	10	10
25	4	1	5	3	4	4
27	2	7	5	8	0	0
29	Unknown	0	5	0	0	0

Table 3-6-1 - Analytical Sampling Schedule

A sampling routine was developed to maintain consistency through the sampling procedures and to protect the integrity of the analytes. In order to limit the samples from exposure to the heat and wind, the amount of time between retrieving and containerizing the samples was minimized. This lowered the potential for volatilization of the compounds of interest and the introduction of foreign compounds contaminating the samples. The sampling routine proceeded as follows:

1. If VOC analysis was required on a sample, a fraction of the sample was quickly and carefully placed in clean glass jars (pre-labeled) with Teflon<sup>®</sup> lined lids. All headspace in the jar was eliminated, and the containers were immediately wrapped in bubble wrap, and placed in a cooler with ice and chilled to 4°C.
2. The remaining fraction was placed in a stainless steel bowl and thoroughly homogenized using stainless steel utensils.
3. To minimize any loss of contaminants through volatilization, the remaining fractions of the samples were containerized in the following order: other organics, explosives (if required), and inorganics.
4. After each sample fraction was collected, the containers were placed in a cooler with ice and chilled to 4°C.

Samples collected for geotechnical analysis were collected at SWMUs 18, 20, 25, and 27. These "undisturbed" samples were collected using a solid wall container placed inside a 2-inch

or 3-inch split spoon sampler. A truly “undisturbed” sample cannot be obtained because of the adverse effects resulting from drilling, sampling, handling and shipping. However, great care was used to obtain these samples so that they were satisfactory for the testing procedures. The split spoon was then mechanically hammered into the ground to collect a 2-foot long core sample. The split spoon was opened, the containers housing the geotechnical sample were removed, the total recovery was recorded, and the ends of the container sealed. The containers were labeled in such a way that the top and bottom of the sample could be distinguished. For instance, if the sample was collected from grade to two feet below grade, the container would be labeled 0 feet at one end and 2 feet at the other. The labeling, documentation, and chain-of-custody procedures discussed above were followed for the samples submitted for geotechnical analysis as well as chemical analysis. The following table (Table 3-6-2) shows the number of geotechnical samples collected at each site.

SWMU Number	Number of:	
	Borings	Geotechnical
18	9	5
20	2	1
25	3	5
27	8	5
29	0	0

Table 3-6-2 - Geotechnical Sampling Schedule

#### 3.6.1. Surface Soil Sampling

Surface soil samples were collected at two of the five SWMUs (SWMUs 20 and 25) for chemical analysis. The surface samples were collected at the surface (0-1') of each location by use of an Art's Manufacturing & Supply stainless steel hand auger. Before a sample was collected, proper sampling bottles were labeled, and the equipment decontaminated. A stainless steel knife was used to extract the material from the auger, and the sample was homogenized in a stainless steel bowl. Extreme care was used to prevent excessive agitation that might result in loss of compounds through volatilization.

### 3.6.2. Drilling Procedures and Subsurface Soil Sampling

Soil borings were drilled using an 8-inch diameter continuous-flight, hollow-stem auger and were drilled by Tierra Drilling Company of El Paso, Texas. Boring locations were determined by the results of the geophysical and topological survey. Total boring depths varied from 10 feet to 50 feet depending on the SWMU, and the number of boring locations varied depending on the size of the SWMU. Drilling fluids were not used at any time during the investigation, and no borings were converted to monitoring wells because groundwater was not encountered. Samples were collected using a 3-inch continuous sampler or a 2-inch split spoon sampler advanced while drilling. Continuous samples of the soil borings were collected to determine contaminant levels and flow paths, and to document the soil types and geological conditions at the sites. Samples were inspected and logged for changes in soils types and features. Detailed geological descriptions were recorded for each boring using the Unified Soil Classification System. Characteristics of the soil/geological profile that indicate zones of higher or lower permeability, level of moisture, level of plasticity, obvious areas of organic content, discoloration, odors, results of the PID screen, and total depth were documented. Detailed geologic logs of each boring are provided in Appendix 3.

With the data from the geophysical survey, the trench boundaries and depths were determined, and the locations of the borings were determined. Boring locations were assigned to be sufficiently close to the edges of the trenches to intercept any contaminants migrating horizontally from the trench, but far enough away that the boring did not compromise the walls of the waste trenches. At SWMUs 18, 25, and 27, one boring location was chosen as an angle boring. The location of the angle boring was chosen in a manner to increase the likelihood of intercepting any contaminants that would migrate from the trench in a vertical manner. The borings were initiated at a point beyond the boundaries of the trench, and advanced at an angle which would bring the auger beneath the bottom of the trench. The angles of these borings were approximately 30 degrees from vertical, and went to the depth of the

other borings required for that respective SWMU. Samples were collected from the angle borings at the prescribed depths below grade, not linear distance. So for a fifty-foot boring, the total boring distance would have been between 55 and 60 feet, but the total depth would have been 50 feet. It should be noted however that the 3-dimensional coordinates of the retrieved samples are more uncertain than the coordinates of the samples which were retrieved by the more conventional vertical boring technique.

A 2-inch split spoon, 3-inch split spoon, and 3-inch continuous samplers were used to collect samples for chemical analysis. These samples were taken at the prescribed depths as dictated by the Workplan. Because of the nature of the testing, any volatilization of analytes in the sample or the introduction of outside contaminants into the samples would have skewed the analytical results. Therefore, the decontamination procedures discussed in Section 3.7 and the sampling and documentation procedures discussed in Section 3.6 were strictly followed.

Geotechnical sampling was also performed for characterization of strata that may positively or negatively influence the migration of contaminants from the waste trenches and into the native soils. The number of geotechnical samples and the depths at which these samples were collected were not predetermined; rather, conditions under which samples were to be collected were predetermined and followed. A geotechnical sample was collected each time a new stratum was encountered during the boring process. A change in stratum was signaled by factors such as abrupt changes in soil texture (i.e., clay, sand or caliche), color, grain size and degree of cementation. While not every boring had every stratum sampled, all strata at the sites were sampled. Samples were collected using solid wall containers housed in a 2-inch or 3-inch split spoon or continuous sampler as discussed in Section 3.6.

After the drilling process was completed to the prescribed depth, all samples were collected, and a determination was made that the formation(s) would not yield sufficient moisture to support the development of a groundwater monitoring well, the borings

were plugged and abandoned. This was accomplished by filling the borings with a non-shrinking cement/bentonite grout mixture to prevent the infiltration of fluids from the surface. The date that each boring was plugged is recorded on the soil boring logs in Appendix 3.

### 3.7. Decontamination

All equipment was decontaminated after each use to avoid the introduction of contaminants into the borings, and to prevent contamination from being transported between samples that might create false sample results or otherwise adversely affect the environment. To accomplish this, decontamination areas were set up at each location. For large equipment, e.g., 8-inch augers, a central area was chosen at each site, and a decontamination pad was constructed. The pad consisted of 6-mil polyethylene sheeting placed on level ground with the four sides elevated to prevent liquid from running off of the pad. A smaller decontamination area was constructed at each boring location for the decontamination of the smaller sampling equipment, e.g., split spoons, utensils, homogenizing bowls. The smaller decontamination areas consisted of 5-gallon buckets placed atop 6-mil polyethylene sheeting. The sampling equipment was decontaminated in a fashion that all drippings from the decontamination procedure were collected in the buckets or on plastic sheeting.

The sampling equipment was disassembled as much as possible for decontamination. After disassembly, decontamination of the sampling equipment was accomplished according to the following procedure:

- Rinsed with water, either tap or deionized.
- Washed with laboratory grade detergent (Alconox) mixed with deionized water, and either scrubbing, for smaller equipment, or using a high pressure spraying device for larger equipment.
- Rinsed two to three times with deionized water.

- Dried using clean paper towels for smaller equipment, or air dried for larger equipment.

Upon completion of the decontamination procedure, the equipment was visually inspected for any obvious signs of contamination. If contamination was found, the procedure was repeated until no signs of contamination were found.

In addition, other controls besides decontamination were implemented to prevent cross contamination. These controls included the following:

- Storing decontaminated equipment separately from contaminated equipment.
- Visually inspecting all equipment before every use to insure that the equipment was not accidentally contaminated.
- Wrapping equipment in clean paper towels when not in use.
- Preliminary cleaning of all equipment prior to each boring.
- Personnel discarding gloves between samples, and whenever gloves become discolored or stained, and whenever torn.

Monitoring the effectiveness of the decontamination procedures by collecting equipment blanks at a rate of at least one per site. Equipment blanks were taken by passing deionized water over decontaminated sampling equipment, collecting the water in laboratory provided containers, and analyzing the water for the same constituents for which the soils were analyzed.

### 3.8. Analytical Requirements and Methods

The analytical laboratory chosen for the chemical analysis of the samples collected during this investigation was Southwest Laboratory of Oklahoma, Inc., 1700 West Albany, Broken Arrow, Oklahoma, 74012. Southwest Labs provided all sampling containers and coolers for sample shipment for the project. Southwest Labs was chosen for this project because of their

extensive qualifications and their ability to perform all required analysis in-house. A copy of their U.S. Army Corps of Engineers Certification is provided in Appendix 11, Analytical Laboratory Reports.

Sample analyses were conducted in accordance with the standard methods from "Test Methods for Evaluating Solid Waste Physical/Chemical Methods," EPA Publication No. SW-846, 1986, and all subsequent revisions; "Methods for Chemical Analysis of Water and Waste," EPA-600/4-79-020, Revised 1983, and those in *Standard Methods for the Examination of Water and Wastewater*, 18<sup>th</sup> edition, 1992.

The test methods used for all soil and water analysis for Volatile Organic Compounds (VOCs) was SW-846 Method 8260. Method 8260 is based upon a purge and trap, gas chromatography with a capillary column and a mass spectrometer (GC/MS) procedure. All samples analyzed for VOCs were extracted by EPA Method 5030 (purge and trap) prior to analysis. The sample volume required for Method 8260 is two 2-ounce glass jars (zero headspace) with Teflon<sup>®</sup>-lined lids for soils. The compounds analyzed by Method 8260 is from the "Target Compound List" and the common chemical names, CAS numbers, and the detection limits for the individual compounds are presented in Table 3-8-1.

The test methods used for all soil and water analysis for Semi-Volatile Organic Compounds (SVOCs) were SW-846 Method 8270. Method 8270 is based upon a gas chromatography with a capillary column and a mass spectrometer (GC/MS) procedure. All samples analyzed for SVOCs were extracted by the SW-846 3500 series methods prior to analysis. The sample volume required for Method 8270 is one 8-ounce glass jar with Teflon<sup>®</sup>-lined lids for soils. The compounds analyzed by Method 820 is from the "Target Compound List" and the common chemical names, CAS numbers, and the detection limits for the individual SVOCs are presented in Table 3-8-2.

The test methods used for all soil and water analysis for chlorinated pesticides and polychlorinated biphenyls (PCBs) were SW-846 Method 8080. Method 8080 is based upon a gas chromatography with a packed column procedure. All samples analyzed for pesticides and

PCBs were extracted by SW-846 Method 3550 prior to analysis. The sample volume required for Method 8080 is one 8-ounce glass jar with Teflon<sup>®</sup>-lined lids for soils. The compounds analyzed by Method 8080 is from the "Target Compound List" and the common chemical names, CAS numbers and the detection limits for the individual PCBs/Pesticides are presented in Table 3-8-3.

The test methods used for all soil and water analysis for metals (except mercury) was SW-846 Method 6010. Method 6010 is based on inductively coupled plasma atomic emission spectroscopy (ICP) methods. ICP allows for simultaneous determination of many elements in a short time. Newer ICP instrument models (Trace ICPs) allow for detection limits comparable to graphite furnace atomic absorption (GFAA) to be achieved. Southwest Laboratories utilized Trace ICPs for metals analysis of the samples submitted during this investigation. Samples were prepared for analysis by SW-846 Method 3050. Mercury analysis was performed by SW-846 Methods 7471. Method 7471 is based on cold-vapor atomic absorption spectrometry (CVAA). The sample volume required for metals analysis is one 8 oz. glass jar with Teflon<sup>®</sup>-lined lids for soils. The list of metals required for this investigation is the "RCRA" list, with additional metals analyzed for SWMU 20. This list, CAS numbers and detection limits are presented in Table 3-8-4, and the metals marked with an asterisk were analyzed for only those samples collected at SWMU 20.

Samples from SWMU 20 also had other parameters that were "unique" to this investigation. Among these were Dioxins/Furans and Explosives. Dioxins/Furans were analyzed by SW-846 Method 8280. This is a GC/MS method, which is able to differentiate and quantify dioxins and furans from the tetrachloro- through the octachloro-dioxins and dibenzofurans on a parts per billion basis. Explosives were analyzed with SW-846 Method 8330, which is a high performance liquid chromatography method (HPLC). Modifications to this method were required for nitroglycerin and RDX. The modification used was the U.S. Army Toxic and Hazardous Materials Agency's method USAED 30. The extractions for these analysis is included in the respective methods, and the sampling requirements for both Dioxins/Furans and explosive were one eight ounce glass jar with Teflon<sup>®</sup>-lined lid. The individual

constituents, detection limits, and CAS number, if applicable, are listed on Table 3-8-6 for Dioxins/Furans, and Table 3-8-5 for explosives.

Additional analysis were performed using the following methods:

- Total Petroleum Hydrocarbons (TPH)—Extraction by Method 9071, analysis by IR Method 418.1
- Nitrate-Nitrite—Method 353.2
- Ignitibility—SW-846 Method 1010
- Free Liquids—SW-846 Method 9095
- Corrosivity (pH)—SW-846 Method 9045

Maxim Technologies, Inc., Geotechnical Division, 222 Calvalcade, Houston, TX, 77009 was the subcontractor chosen to perform analyses of the geotechnical parameters. The geotechnical testing performed were Constant Head Permeability (ASTM D 2434), Falling Head Permeability (ASTM D 5084), pH (EPA SW-846 9045C), Cation Exchange Capacity (EPA SW-846 9081), Fraction Organic Content (ASTM D 2974C), Grain Size Analysis (ASTM D 422), and Atterberg Limits (ASTM D 4318).

Test methods for permeabilities, i.e., constant or falling head, were determined according to ASTM D 5084, which states "This test method may be utilized with undisturbed or compacted specimen that have a hydraulic conductivity less than or equal to  $1 \times 10^{-5}$  m/s or  $1 \times 10^{-3}$  cm/s....the hydraulic conductivity of materials with hydraulic conductivity greater than  $1 \times 10^{-5}$  m/s may be determined by Test Method D 2434." Thus samples had one of these two methods performed during analysis, but not both methods. Additionally, the only samples that received analysis for Grain Size Analysis and Atterburg Limits were samples that were collected from the caps on the waste trenches.

COMMON NAME	CAS NUMBER	DETECTION LIMIT (µg/Kg)
Chloromethane	74-87-3	5
Bromomethane	74-83-9	5
Vinyl Chloride	75-01-4	5
Chloroethane	75-00-3	5
Methylene Chloride	75-09-2	5
Acetone	67-64-1	5
Carbon Disulfide	75-15-0	5
1,1-Dichloroethene	75-35-4	5
1,1-Dichloroethane	75-34-3	5
Trans-1,2-Dichloroethene	156-60-5	5
Cis-1,2-Dichloroethene	156-59-2	5
Chloroform	67-66-3	5
1,2-Dichloroethane	107-06-2	5
2-Butanone	78-93-3	5
1,1,1-Trichloroethane	71-55-6	5
Carbon Tetrachloride	56-23-5	5
Vinyl Acetate	108-05-4	5
Bromodichloromethane	75-27-4	5
1,1,2,2-Tetrachloroethane	79-34-5	5
1,2-Dichloropropane	78-87-5	5
Trans-1,3-Dichloropropene	10061-02-6	5
Trichloroethene	79-01-6	5
Dibromochloromethane	124-48-1	5
1,1,2-Trichloroethane	79-00-5	5
Benzene	71-43-2	5
Cis-1,3-Dichloropropene	10061-01-5	5
2-Chloroethyl Vinyl Ether	110-75-8	5
Bromoform	75-25-2	5
2-Hexanone	591-78-6	5
4-Methyl-2-Pentanone	108-10-1	5
Tetrachloroethene	127-18-4	5
Toluene	108-88-3	5
Chlorobenzene	108-90-7	5
Ethylbenzene	100-41-4	5
Styrene	100-42-5	5
m,p-Xylene	13-302-07	5
o-Xylene	95-47-6	5

Table 3-8-1 - Volatile Organic Compounds Analyzed by Method 8260

COMMON NAME	CAS NUMBER	DETECTION LIMIT (µg/Kg)
Phenol	108-95-2	340
Bis(2-chloroethyl)ether	111-44-4	340
2-Chlorophenol	95-57-8	340
1,3-Dichlorobenzene	541-73-1	340
1,4-Dichlorobenzene	106-46-7	340
Benzyl Alcohol	100-51-6	340
1,2-Dichlorobenzene	95-50-1	340
2-Methylphenol	95-48-7	340
Bis(2-chloroisopropyl)ether	108-60-1	340
4-Methylphenol	106-44-5	340
n-Nitroso-di-n-propylamine	621-64-7	340
Hexachloroethane	67-72-1	340
Nitrobenzene	98-95-3	340
Isophorone	78-59-1	340
2-Nitrophenol	88-75-5	340
2,4-Dimethylphenol	105-67-9	340
Benzoic Acid	65-85-0	1700
Bis(2-chloroethoxy)methane	111-91-1	340
2,4-Dichlorophenol	120-83-2	340
1,2,4-Trichlorobenzene	120-82-1	340
Naphthalene	91-20-3	340
4-Chloroaniline	106-47-8	340
Hexachlorobutadiene	87-68-3	340
4-Chloro-3-methylphenol	59-50-7	340
2-Methylnaphthalene	91-57-6	340
Hexachlorocyclopentadiene	77-47-4	340
2,4,6-Trichlorophenol	88-06-2	340
2,4,5-Trichlorophenol	95-95-4	1700
2-Chloronaphthalene	91-58-7	340
2-Nitroaniline	88-74-4	1700
Dimethyl phthalate	131-11-3	340
Acenaphthylene	208-96-8	340
3-Nitroaniline	99-09-2	1700
Acenaphthene	83-32-9	340
2,4-Dinitrophenol	51-28-5	1700
4-Nitrophenol	100-02-7	1700
Dibenzofuran	132-64-9	340
2,4-Dinitrotoluene	121-14-2	340

Table 3-8-2 - Semi-Volatile Organic Compounds Analyzed by Method 8270

COMMON NAME	CAS NUMBER	DETECTION LIMIT (µg/Kg)
2,6-Dinitrotoluene	606-20-2	340
Diethylphthalate	84-66-2	340
4-Chlorophenyl-phenylether	7005-72-3	340
Fluorene	86-73-7	340
4-Nitroaniline	100-01-6	1700
4,6-Dinitro-2-methylphenol	534-52-1	1700
n-Nitrosodiphenylamine	86-30-6	340
4-Bromophenyl-phenylether	101-55-3	340
Hexachlorobenzene	118-74-1	340
Pentachlorophenol	87-86-5	1700
Phenanthrene	85-01-8	340
Anthracene	120-12-7	340
Di-n-butyl phthalate	84-74-2	340
Fluoranthene	206-44-0	340
Pyrene	129-00-0	340
Butyl benzyl phthalate	85-68-7	340
3,3'-Dichlorobenzidine	91-94-1	690
Benzo(a)anthracene	56-55-3	340
Bis(2-ethylhexyl)phthalate	117-81-7	340
Chrysene	218-01-9	340
Di-n-octyl phthalate	117-84-0	340
Benzo(b)fluoranthene	205-99-2	340
Benzo(k)fluoranthene	207-08-9	340
Benzo(a)pyrene	50-32-8	340
Indeno(1,2,3-cd)pyrene	193-39-5	340
Dibenz(a,h)anthracene	53-70-3	340
Benzo(g,h,i)perylene	191-24-2	340

Table 3-8-2 (Cont.) - Semi-Volatile Organic Compounds Analyzed by Method 8270

COMMON NAME	CAS NUMBER	DETECTION LIMIT (µg/Kg)
Alpha-BHC	319-84-6	1.4
Beta-BHC	319-85-7	1.4
Gamma-BHC (Lindane)	58-89-9	1.4
Delta-BHC	319-86-8	1.4
Heptachlor	76-44-8	1.4
Aldrin	309-00-2	1.4
Heptachlor epoxide	1024-57-3	1.4
Endosulfan II	959-98-8	1.4
4,4'-DDE	72-55-9	2.6
Dieldrin	60-57-1	2.6
Endrin	72-20-8	2.6
Endosulfan II	33213-65-9	2.6
4,4'-DDD	72-54-8	2.6
Endosulfan sulfate	1031-07-8	2.6
4,4'-DDT	50-29-3	2.6
Endrin aldehyde	7421-93-4	2.6
Methoxychlor	72-43-5	14
Alpha-chlordane	5103-71-9	1.4
Gamma-chlordane	5103-74-2	1.4
Endrin ketone	53494-70-5	2.6
Toxaphene	8001-35-2	86
Aroclor-1016	12674-11-2	35
Aroclor-1221	11104-28-2	35
Aroclor-1232	11141-16-5	35
Aroclor-1242	53469-21-9	35
Aroclor-1248	12672-29-6	35
Aroclor-1254	11097-69-1	70
Aroclor-1260	11096-82-5	70

Table 3-8-3 - PCBs and Chlorinated Pesticide Analyzed by Method 8080

COMMON NAME	CAS NUMBER	DETECTION LIMIT (mg/Kg)
Arsenic	7440-38-2	0.5
Barium	7440-39-3	0.1
Cadmium	7440-43-9	0.1
Chromium	7440-47-3	0.1
Lead	7439-92-1	0.3
Selenium	7782-49-2	0.5
Silver	7440-22-4	0.2
Mercury <sup>1</sup>	7439-97-6	0.0
Antimony*	7440-36-0	0.4
Copper*	7440-50-8	1.0
Iron*	7439-89-6	2.0
Potassium*	7440-09-7	10.0
Strontium*	7440-24-6	0.1
Zinc*	7440-66-6	2.0

Table 3-8-4 - List of Metals Analyzed by 6010

<sup>1</sup> Mercury was analyzed by Method 7471.

\* These metals were analyzed only for samples from SWMU 20.

COMMON NAME	CAS NUMBER	DETECTION LIMIT (µg/Kg)
HMX	2691-41-0	2200
RDX	121-82-4	1000
2,4,6-TNT	118-96-7	250
2,6-Dinitrotoluene	606-20-2	250
2,4-Dinitrotoluene	121-14-2	250
Nitroglycerin	55-63-0	1000
EXP(TNR,Picric)	82-71-3,88-89-1	37

Table 3-8-5 - List of Explosives

COMMON NAME	CAS NUMBER	DETECTION LIMIT (µg/Kg)
2378-TCDD	1746-01-6	0.0104
2378-TCDF	51207-31-9	0.0062
12378-PECDF	57117-41-6	0.0204
12378-PECDD	40321-76-4	0.0379
23478-PECDF	57117-31-4	0.0189
123478-HXCDF	70648-26-9	0.0115
123678-HXCDF	57117-44-9	0.0098
123478-HXCDD	39227-28-6	0.0341
123678-HXCDD	57653-85-7	0.0298
123789-HXCDD	19408-74-3	0.0293
234678-HXCDF	60851-34-5	0.0108
123789-HXCDF	72918-21-9	0.0107
1234678-HPCDF	67562-39-4	0.0181
1234678-HPCDD	35822-46-9	0.0264
1234789-HPCDF	55673-89-7	0.0187
OCDD	3268-87-9	5
OCDF	39001-02-0	0.0258
Total TCDD	41903-57-5	0.01041
Total PECDD	55722-27-5	0.03787
Total HXCDD	36088-22-9	0.02975
Total HPCDD	30402-15-4	0.02636
Total TCDF	34465-46-8	0.00623
Total PECDF	55684-94-1	0.01888
Total HXCDF	37871-00-4	0.00981
Total HPCDF	38998-75-3	0.01807

Table 3-8-6 - Tetra- through Octa-chloro Dioxins and  
Dibenzo Furans Analyzed by Method 8280

### 3.9. Field QA/QC

Field quality assurance and quality control (QA/QC) were performed in order to provide accurate and legitimate data for the various aspects of this investigation. This was accomplished by ensuring that the various aspects of the process were accomplished in a consistent and correct fashion.

During the actual sampling process each person was assigned tasks for the investigation, and held that responsibility for the duration of the project. This maintained accountability and eliminated any confusion that might be created by reassigning tasks during the project. Additionally, the field supervisor served as the QA/QC officer, and administered all activities that involved subcontractors, equipment, and processes, including the following:

- Sampling supplies clean and free of defects.
- A sufficient supply of consumable materials, i.e., ice for storing samples; decontamination supplies, sample containers and gloves.
- Subcontractors' work up to industry standards.
- Contact with USACE project manager when deviations from the Workplan were necessary.
- Sufficient documentation of all activities.
- Decontamination and sampling procedures were strictly followed.
- Samples sent to the laboratory were shipped on ice, and sent via overnight freight at the end of every day that samples were collected.

QA/QC samples were included in the shipment to the laboratory. These included rinsate blanks and split-samples. QA/QC samples provide a basis for evaluating the performance of the sampling process and the contract laboratory. QA/QC samples were taken at every site that had samples collected.

To measure the effectiveness of the decontamination process, rinsate blanks were collected. Rinsate blanks are collected by using reagent water as the final rinse from the decontamination of all sampling equipment. Rinsate blanks are used to determine if there is cross contamination between samples due to insufficiently decontaminated sampling equipment or sampling

procedures. The rinsate blanks were identified by number so that they could be associated with the field sample for which the equipment was decontaminated. At least one rinsate blank per site was collected, and analyzed for the same parameters that the soil samples at the respective sites were.

To effectively measure the quality and consistency of the contract laboratory, split samples were collected. Split samples for VOC analysis were collected from the same split-spoon sampler, immediately adjacent to each other, and were not homogenized. After the collection of the VOC portion of the split sample, the remaining portion of the sample was homogenized by mixing, then divided into two or more parts and placed in separate container sets for analysis of all other parameters. One set of containers was sent to the contract laboratory, and the other was sent to the USACE Southwest Division Laboratory. The split samples were sent to separate laboratories so that independently-derived analytical results may be compared for consistency. Sample pre-treatment, handling methods, and as much as possible, the methods of analysis will be the same for both samples to allow for accurate comparison. This is to validate the analytical results and laboratory documentation. The number of split QC/QA samples that were collected were approximately 10% of the number of samples collected at the site.

### 3.10. IDW Handling and Disposal

The cuttings generated from soil boring and boring cores not used for bulk sampling were collected and containerized in DOT approved 55-gallon drums. Each drum has been identified in a manner which permits the identification of the source of the enclosed wastes. The drums are located onsite in close proximity to the borehole from which the wastes were generated. The drums will remain onsite until the sampling results have been presented and reviewed as a part of this Report. Following a review of the findings of this Report, Fort Bliss and the USACE, Fort Worth District, will be consulted regarding the ultimate disposition of these wastes.



## **4. CHARACTERIZATION OF SWMUs**

This section of the RFI Report discusses the data evaluation methodology employed in analyzing the results of the chemical sampling activities. In addition, the process used to reduce the data gathered during the GPS survey into New Mexico State Plane coordinates is detailed. Following these two items is a site-specific discussion of the historical background, previously existing reports, field investigation, and detailed investigation findings for each SWMU.

### **4.1. Data Evaluation**

The following sections describe the data validation and evaluation processes used to determine the usability of the data generated, and to determine if any contamination found is significant. Also included is a discussion and results of the GPS survey.

#### **4.1.1. Background Data and Conditions**

Roy F. Weston, Inc. (Weston) of Houston, Texas was tasked by the USACE to complete three background soil borings in the general areas of the five sites, collect samples from these borings, and have these samples analyzed for chemical and geotechnical parameters. The following discussion is adapted from Weston's report titled "RCRA Facility Investigation Report, Fort Bliss, Texas." Weston's report should be consulted for detailed information on the chemical analyses of background soil samples including the name of the analytical laboratory, the analytical methods used by the laboratory, and the procedures used to evaluate and validate the analytical results.

Fourteen background surface and subsurface soil samples were collected from three soil borings (SB1911, SB25B08, and SB27B08) to provide a basis for evaluating background conditions for SWMUs 18, 20, 25, and 27. All of the background samples were analyzed for VOCs, SVOCs, pesticides/PCBs, RCRA metals, TPH, and nitrate.

Soil boring SB1911 is located approximately 0.75 mile west-northwest of SWMU 76 and in the general vicinity of SWMUs 18 and 20; the data from this boring was utilized to provide background information on both SWMUs 18 and 20. Boring SB1911 was completed to a depth of approximately 50 feet and five background samples were collected at nearly 10-foot intervals ending at a depth of 40 feet. Boring SB25B08 is located approximately 0.2 mile northeast of SWMU 25B and in the general vicinity of SWMU 25; the data generated from this boring was utilized to provide background information for SWMU 25. This boring was completed to a depth of approximately 40 feet and four background samples were collected at depths of 0, 5, 10 and 20 feet. Boring SB27B08 is located approximately 0.3 mile south of SWMU 27B and in the general vicinity of SWMU 27; the data generated from this boring was utilized to provide background information for SWMU 27. Boring SB27B08 was completed to a depth of approximately 50 feet and five background samples were collected at approximately 10-foot intervals ending at a depth of 40 feet. Figures 4-1-1, 4-1-2 and 4-1-3, included at the end of Section 4.1, illustrate the locations of the three background borings relative to the SWMU locations.

#### 4.1.2. Data Validation and Results

The data generated from this investigation was inspected and evaluated for consistency with the Workplan and usability. This was a multi-step process that involved the comparison of the Workplan requirements with the actual investigation process, and the evaluation of the quality control data supplied by the laboratory. Additionally, the Chemical Quality Assurance Reports (CQARs) produced by the USACE South West Division Laboratory (SWDL) were studied for additional input on the usability of the laboratory data.

The comparison of the Workplan requirements consisted of comparing actual holding times with maximum allowable holding times, ensuring that the temperature of the sample coolers upon arrival at the laboratory were within quality control limits, and

that analyses performed were consistent with the analysis required. Evaluation of the laboratory quality control data involved comparing several different controls. These include the matrix spike (MS) and matrix spike duplicate (MSD) recoveries and relative percent differences (RPDs), sample and duplicate RPDs, surrogate recoveries, blank spike and blank spike duplicate recoveries and RPDs, and laboratory blanks and laboratory control samples within quality control limits.

The results of the Workplan comparison revealed that most of the analyses were performed in the proper holding time. Most of the coolers arrived in the laboratory between 2° and 6°C. Most of the analyses performed generally agreed with the analyses requested. In the case of metals analysis, the primary laboratory was made aware of the specific compounds to be analyzed prior to the initialization of field activities; thus, the specific metal compounds to be analyzed did not appear on the individual chains-of-custody. Additionally, the contract laboratory and the QA laboratory were contacted the first working day following sample shipment to ensure that any problems with sample shipment, including any errors in the chains-of-custody would be rectified as soon as possible. Any specific deviations in the analyses, holding time, temperatures, and chain-of-custody documentation are addressed in the Sampling Results Section in the discussion on the individual SWMUs.

The laboratory quality control data was evaluated against the laboratory control limits. Some quality control was found to be outside of control limits. The most common out-of-control events involved LCS/LCSD and MS/MSD recoveries and RPDs for the volatile organic compounds (VOCs). Specifically, for the compounds of 2-hexanone, 2-butanone, methyl-2-pentanone, and acetone. Additionally, acetone and methylene chloride were observed in several of the method blanks and rinsate samples. These are common laboratory contaminants, and there were also detections of these compounds in the associated field samples at approximately the same levels. Because of this, the detections of these compounds in the associated field samples will be treated as

unrelated laboratory contamination if the concentrations of the detections are within ten times of the detection limit.

Finally, the results of the data evaluation process were compared against the CQARs. The CQAR for each SWMU sampled are presented in Appendix 11. The specific comments on laboratory quality control are numbered, and responses to these comments are on the comment sheet following each individual CQAR. The common responses are either coded with letters or addressed specifically. A code key is included in the front of Appendix 11. Any deviations that affect the laboratory results are addressed in the Sampling Results Section in the discussion on the individual SWMUs.

#### 4.1.3. Data Evaluation Methods

All data was received from the laboratory in hard copy and in electronic data format on diskette. The electronic data information for all samples included results, CAS numbers, detection limits, dates of sampling and analysis, and laboratory QC batch numbers. Also included were the laboratory quality control results for each sample batch. The information from Weston on the previously discussed background concentrations was also received in electronic format. This data was downloaded into a database specifically constructed for this type of investigation. Using the database's capabilities, a three-step process was utilized to determine the significance of any contaminants found.

First, the data related to field samples and laboratory duplicate samples was evaluated to identify the compound concentrations that were reported above the laboratory detection limit. Next, the detected concentrations of common laboratory contaminant constituents were examined to determine if they exceeded ten times their related detection limits. For the purpose of this Report, the compounds identified as common laboratory contaminants are acetone, methylene chloride, 2-butanone and toluene. Sample constituent concentrations that passed these first two screening procedures were then compared to statistically derived background concentrations.

The background concentrations developed for comparison with field sampling results were calculated by first averaging the sample results for each individual constituent from the specific background boring for each particular site. For instance, the sampling results for background soil boring SB19-11 was used for comparisons to the field sampling results for both SWMUs 18 and 20. Next the standard deviation was calculated and the background value was derived using a one-tail *t* distribution with a 95% confidence interval. In instances where the background samples had concentrations below the detection limit, the laboratory detection limit was used to generate the average background concentration.

Sample results exceeding background concentrations are tabulated and discussed in the individual SWMU narratives that follow Subsection 4.1. These tabulated constituent concentrations are then compared with the EPA Region III Risk-Based Concentrations (RBCs) for Residential Soil Ingestion in order to evaluate the significance of the contaminant levels. In those instances where Region III RBCs were not published for a particular constituent, the EPA Region IX Preliminary Remediation Goals for September of 1995 were substituted. The results of the sample data evaluation process are tabulated in Appendix 9. Tabulated background sampling data and the statistically derived background concentrations are also included in Appendix 9.

It should not be inferred that the constituent background levels generated from the available background sampling data provide a reasonable representation of the natural state of the geochemical environment at the point at the SWMUs where soil samples were collected. For a variety of reasons, this geochemical environment may vary drastically even over relatively minor surface distances. Therefore, the results of the comparisons of site sampling analytical results with those calculated for background levels should be viewed in qualitative, general terms rather than in an absolute, quantitative sense.

#### 4.1.4. Global Positioning System Satellite Surveying Results

The last phase of the surveying task is the computation of the positions for the permanent bench marks. As discussed in Section 3.3, the positions of these bench marks were calculated from found National Geodetic Survey (NGS) stations. The NGS publishes the positions of these stations in geodetic coordinates (latitude, longitude, and height) and in the NAD 83 Earth-centered Cartesian coordinate system (X,Y,Z).

The geodetic coordinates are worldwide and are based on the point 0 degrees North/South, 0 degrees East/West, the point where the Greenwich Meridian and the Equator intersect. The Cartesian coordinates, on the other hand, are referenced to the local state reference system(s). The advantage of using the geodetic coordinates is that there is only one coordinate position for each point on the earth's surface. This enables any interested party anywhere on the earth to locate these stations precisely in relation to where they are. In the Cartesian coordinate system, positions referenced could be confused with another location on earth. The Cartesian system is a local reference to the overall geodetic position and is based on a "grid" system. The grid is the surface of the earth modified to a flat plane for mapping purposes.

Each local reference system has its own modifications (scale factors), which take into account the actual horizontal and vertical locations on the earth's surface. The local reference systems are used to keep the scale factors as close to one as possible. The scale factors are adjustments that are applied to properly translate the positions from one system to another.

The bench marks for this project are published in the real world geodetic coordinates. The Cartesian coordinates are referenced to the New Mexico, Central Zone State Plane Coordinate System, with the coordinates based on the meter. The X,Y,Z grid coordinates have their origin based on the Easting of 500,000m at Longitude 106 degrees 15 minutes 00 seconds, and the Northing of 0m at Latitude 31 degrees 00

minutes 00 seconds. In both reference systems, the elevations (in meters) are based on mean sea level.

Table 4-1-1, which follows this page, presents data on the 18 bench mark monuments constructed and surveyed as a part of this RFI. Typical calculations used to establish the bench mark coordinates are included in Appendix 4. The X,Y,Z grid coordinates for all sampling data points are also included in Appendix 4. The locations of the found NGS stations and the constructed bench mark monuments may be referenced on Figures 4-1-1, 4-1-2, and 4-1-3 which follow Table 4-1-1.

## RCRA.PRN

Thompson Professional Group, Inc.  
RCRA-White Sands Missile Range

10/24/96

-----  
Original Coords. on NAD 83 Geographic Coordinates  
Translated Coords. on NAD 83 State Plane - NM Cent.3002,U.S.FT  
Input Vertical - NAVD 88, METERS  
Output Vertical - NAVD 88, U.S. FT  
-----

NAME	INPUT	OUTPUT
18BM1	32 04 24.40726 N	390462.27112 N
	106 10 20.40648 W	1664472.42181 E
Heights	1249.86410	4100.59580
Convergence		00 02 28.46588
Scale Factor		0.999900663
18BM2	32 04 11.15875 N	389122.86634 N
	106 10 31.66327 W	1663504.83099 E
Heights	1249.52700	4099.48983
Convergence		00 02 22.47385
Scale Factor		0.999900611
19BM1	32 04 14.49031 N	389458.52523 N
	106 10 48.78101 W	1662031.77249 E
Heights	1246.41020	4089.26413
Convergence		00 02 13.38859
Scale Factor		0.999900535
19BM2	32 04 00.91526 N	388087.52709 N
	106 10 36.19269 W	1663115.81432 E
Heights	1248.74990	4096.94030
Convergence		00 02 20.05784
Scale Factor		0.999900590
20BM1	32 05 09.80841 N	395049.89362 N
	106 10 20.90660 W	1664426.09587 E
Heights	1255.50590	4119.10561
Convergence		00 02 28.25237
Scale Factor		0.999900660
20BM2	32 04 48.25632 N	392872.51310 N
	106 10 14.56551 W	1664973.19800 E
Heights	1253.36260	4112.07380
Convergence		00 02 31.59544
Scale Factor		0.999900691
25bBM1	32 24 31.81066 N	512474.18702 N
	106 09 19.44501 W	1669609.97965 E
Heights	1272.78550	4175.79709
Convergence		00 03 02.52295

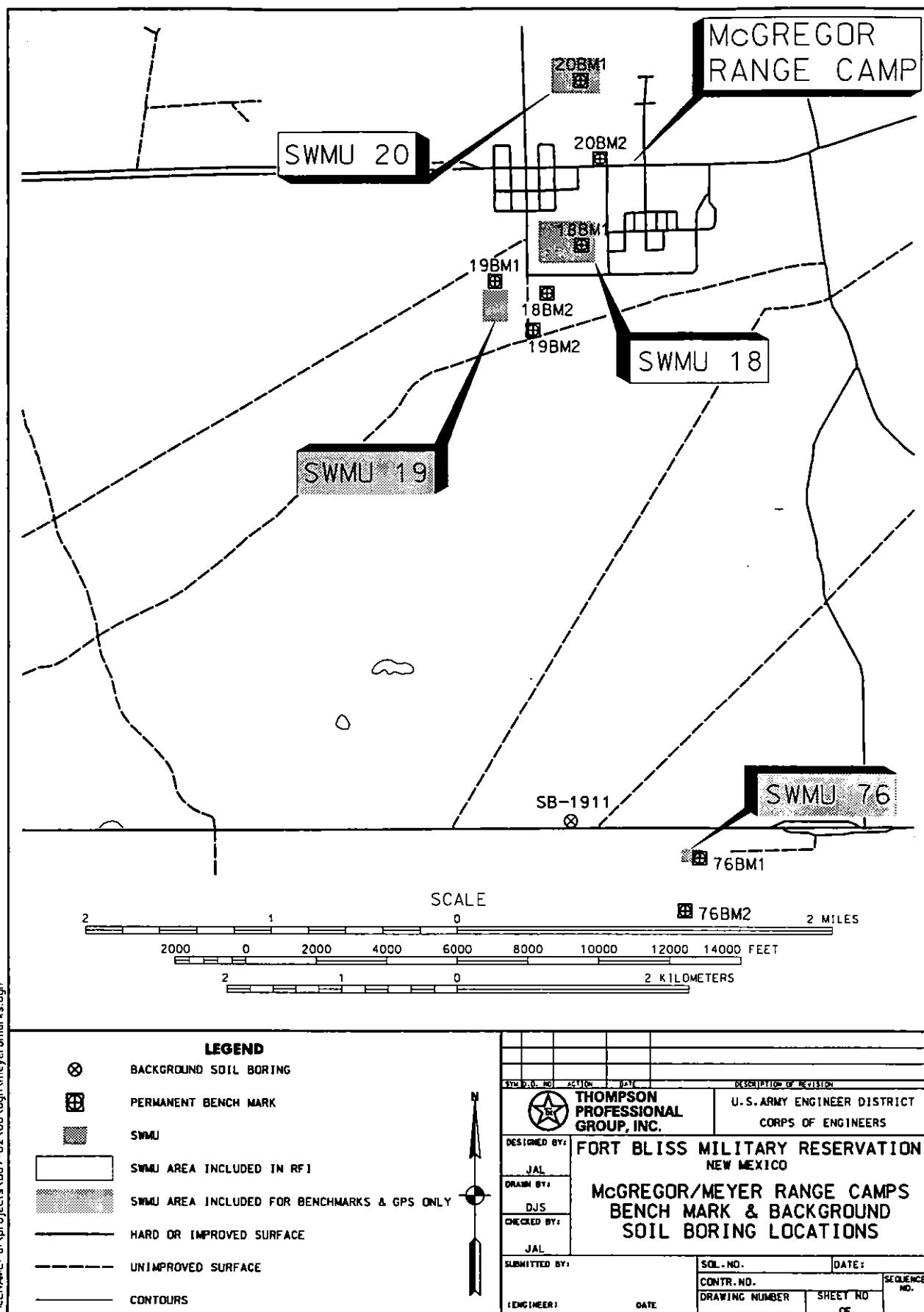
Table 4-1-1  
Section 4 - Page 8

	RCRA.PRN		
Scale Factor			0.999900976
25bBM2	32 24 38.73353 N	513169.73390 N	
	106 10 17.44215 W	1664637.78977 E	
Heights	1254.17290	4114.73226	
Convergence		00 02 31.44693	
Scale Factor		0.999900672	
25BM1	32 23 37.20133 N	506956.84221 N	
	106 09 05.86164 W	1670779.46126 E	
Heights	1286.97590	4222.35343	
Convergence		00 03 09.72391	
Scale Factor		0.999901056	
25BM2	32 23 22.45455 N	505466.94524 N	
	106 09 02.11663 W	1671101.93279 E	
Heights	1281.05310	4202.92171	
Convergence		00 03 11.70863	
Scale Factor		0.999901078	
27bBM1	32 08 29.99670 N	415368.09204 N	
	106 30 41.50054 W	1559471.64145 E	
Heights	1243.39490	4079.37143	
Convergence		-00 08 20.89444	
Scale Factor		0.999907504	
27bBM2	32 08 06.97531 N	413042.89681 N	
	106 30 46.66159 W	1559022.24195 E	
Heights	1239.06390	4065.16215	
Convergence		-00 08 23.55077	
Scale Factor		0.999907588	
27BM1	32 08 27.98448 N	415169.24779 N	
	106 31 02.75566 W	1557643.73295 E	
Heights	1246.39930	4089.22837	
Convergence		-00 08 32.19469	
Scale Factor		0.999907847	
27BM2	32 08 48.42399 N	417233.86956 N	
	106 30 59.18531 W	1557955.80495 E	
Heights	1253.52290	4112.59971	
Convergence		-00 08 30.37570	
Scale Factor		0.999907788	
29BM1	32 08 59.13065 N	418310.80962 N	
	106 30 35.60817 W	1559985.34213 E	
Heights	1249.58980	4099.69587	
Convergence		-00 08 17.87146	
Scale Factor		0.999907409	
29BM2	32 08 42.88291 N	416667.71495 N	
	106 30 29.40526 W	1560514.65193 E	
Heights	1243.15460	4078.58305	
Convergence		-00 08 14.50864	

Table 4-1-1  
Section 4 – Page 9

	RCRA. PRN		
Scale Factor			0.999907312
76BM1	32 01 33.03392 N		373148.13462 N
	106 09 41.75268 W		1667812.30848 E
Heights	1247.83890		4093.95146
Convergence		00 02 48.76720	
Scale Factor		0.999900860	
76BM2	32 01 18.29965 N		371658.96131 N
	106 09 46.50262 W		1667404.62015 E
Heights	1251.66180		4106.49376
Convergence		00 02 46.22931	
Scale Factor		0.999900834	
eleph	32 23 35.13175 N		506749.55464 N
	106 08 43.15597 W		1672726.38542 E
Heights	1424.95180		4675.02936
Convergence		00 03 21.88493	
Scale Factor		0.999901196	
grand	32 24 02.66324 N		509529.13178 N
	106 09 14.74426 W		1670015.58348 E
Heights	1327.53600		4355.42436
Convergence		00 03 05.00117	
Scale Factor		0.999901003	
range	32 08 46.99021 N		417077.52332 N
	106 30 03.68296 W		1562727.00067 E
Heights	1241.56500		4073.36784
Convergence		-00 08 00.83769	
Scale Factor		0.999906913	

Table 4-1-1  
Section 4-Page 10



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Figure 4-1-1  
 Section 4 – Page 11

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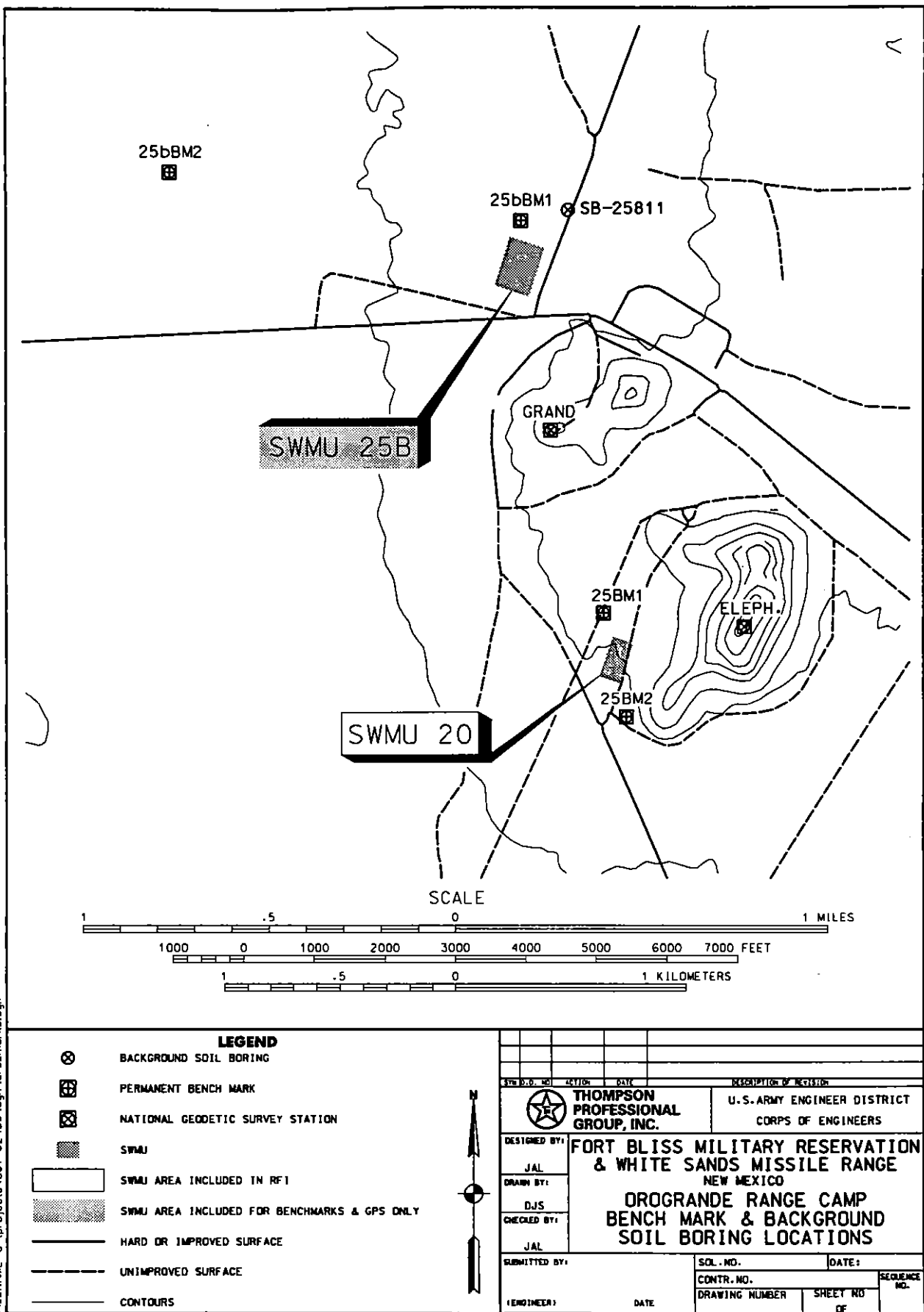


Figure 4-1-2  
 Section 4 -- Page 12

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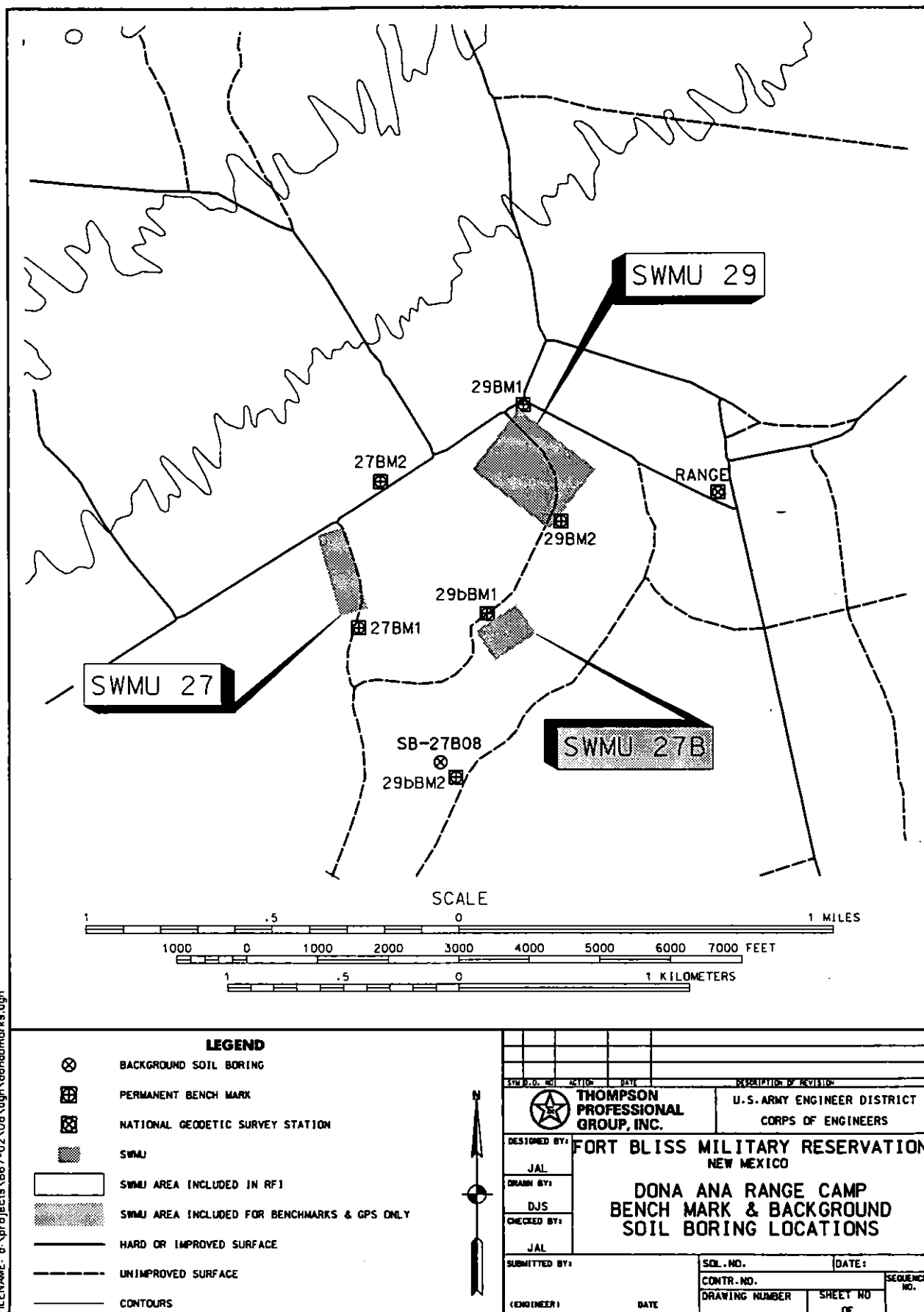


Figure 4-1-3  
 Section 4 – Page 13



#### 4.2. SWMU 18-McGregor Range Rubble Pit/Landfill

Solid Waste Management Unit (SWMU) 18 is known as the McGregor Rubble Pit/Landfill. This site has also been identified as Landfill No. 13 (FTBL-013). The landfill is located one-quarter mile south of the McGregor Range Camp. The Range Camp is located on the Fort Bliss Military Reservation which covers approximately 1.2 million acres of land in New Mexico and Texas near El Paso, Texas.<sup>18</sup> The site is located in the New Mexico portion of the Fort Bliss Military Reservation within the Hueco Basin of the New Mexico Highland section of the Basin and Range province approximately 30 miles northeast of El Paso.<sup>19</sup> An Aerial Photograph (Figure 4-2-1) of the site is located on the following page.

The Site Location Map (Figure 4-2-2) shows the general location of SWMU 18 relative to other SWMUs situated in and around the McGregor Range Camp area, and is located after the Aerial Site View.

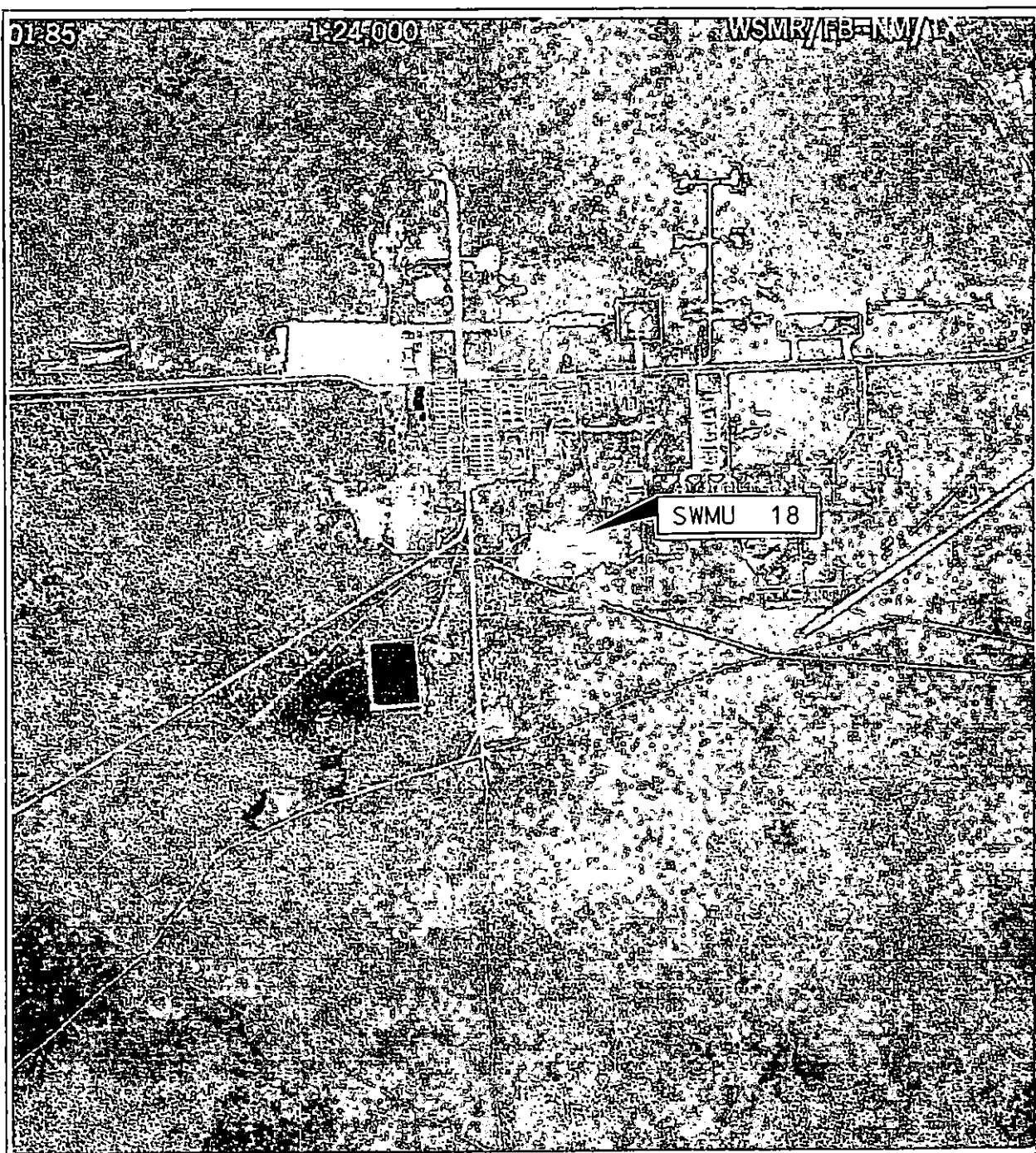
##### 4.2.1. Unit Description and Characteristics

SWMU 18 is a trench-type landfill, underlain and covered with soil. The landfill is currently inactive, but was operated by Fort Bliss on land owned by the Bureau of Land Management. The specific topography of the site is depicted on the SWMU 18 Site Plan (Figure 4-2-3) located on the following pages. The landfill has been reported as encompassing an area of about 15 acres. The RFA Report by A.T. Kearney, Inc. states that the site contains numerous waste pits, estimated to be as many as 10, located across an area of 10 to 20 acres that have received waste from the Range Camp since World War II. The United States Army Corps of Engineers, in conjunction with Fort Bliss, has indicated that there are numerous trenches incorporated at this site with the most recent opened in 1983. This most recent trench was

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<sup>18</sup> A.T. Kearney, Inc., RCRA Facility Assessment PR/VSI Report: U.S. Army Air Defense Artillery Center and Fort Bliss, Texas, Prepared for the U.S. Environmental Protection Agency, Chicago, IL, 1989.

<sup>19</sup> Section 2, Environmental Setting for a general overview of the geology and hydrogeology in this area.



<h2 style="margin: 0;">McGREGOR RANGE</h2> <h2 style="margin: 0;">RUBBLE PIT/LANDFILL</h2>		
DATE OF PHOTOGRAPH	12-01-85	
SCALE 1:24,000		
AERIAL PHOTOGRAPHY COURTESY OF FORT BLISS DEPARTMENT OF PUBLIC WORKS		
<b>THOMPSON PROFESSIONAL GROUP, INC.</b>		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS
DESIGNED BY: JAL DRAWN BY: DJS CHECKED BY: JAL		<b>FORT BLISS MILITARY RESERVATION</b> NEW MEXICO <b>McGREGOR RANGE CAMP</b> <b>AERIAL SITE VIEW</b>
SUBMITTED BY: _____ (ENGINEER)		SOL. NO. _____ CONTR. NO. _____ DRAWING NUMBER _____
DATE _____		DATE: _____ SHEET NO. _____ OF _____ SEQUENCE NO. _____

Figure 4-2-1  
Section 4 – Page 15

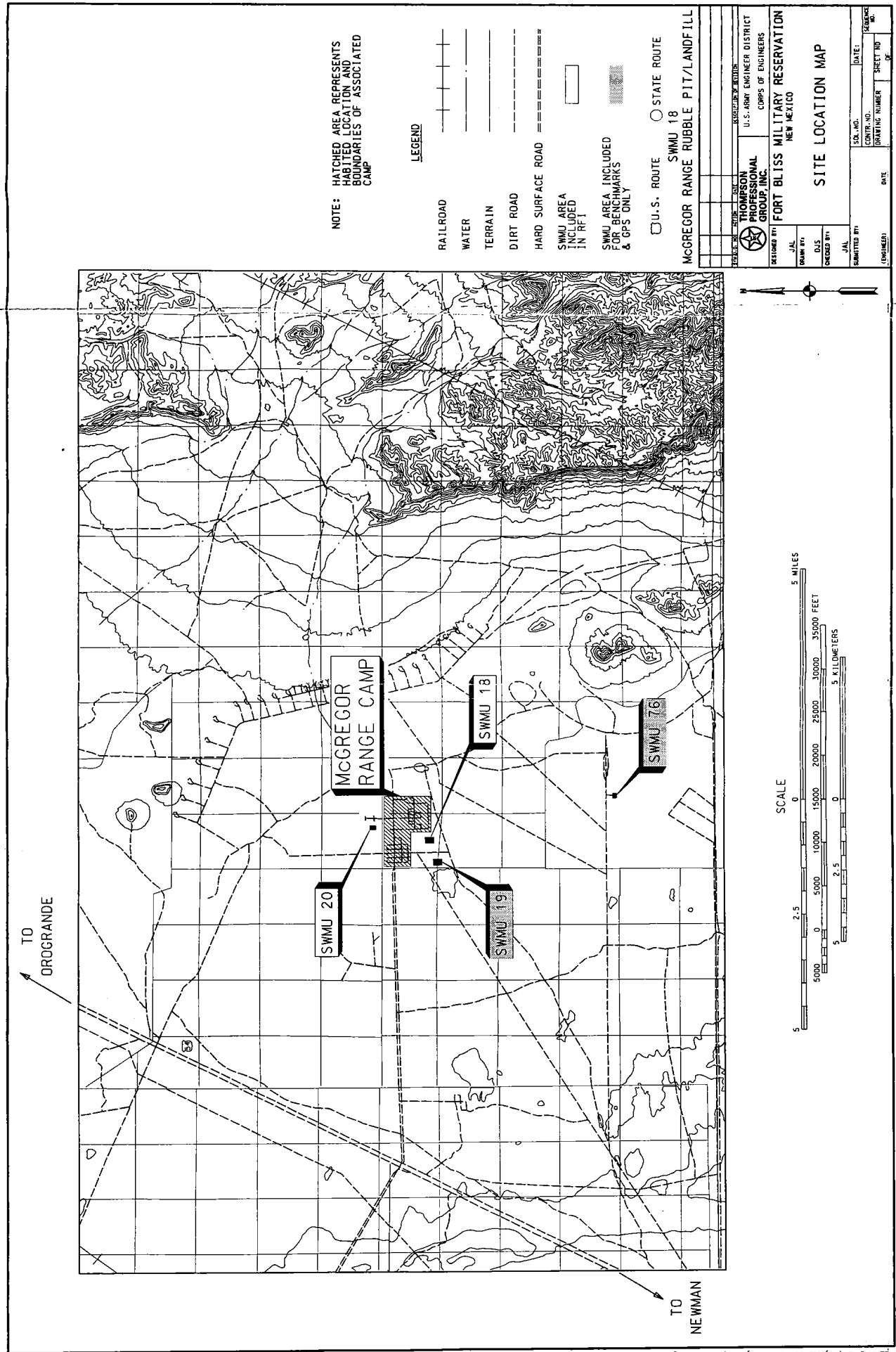
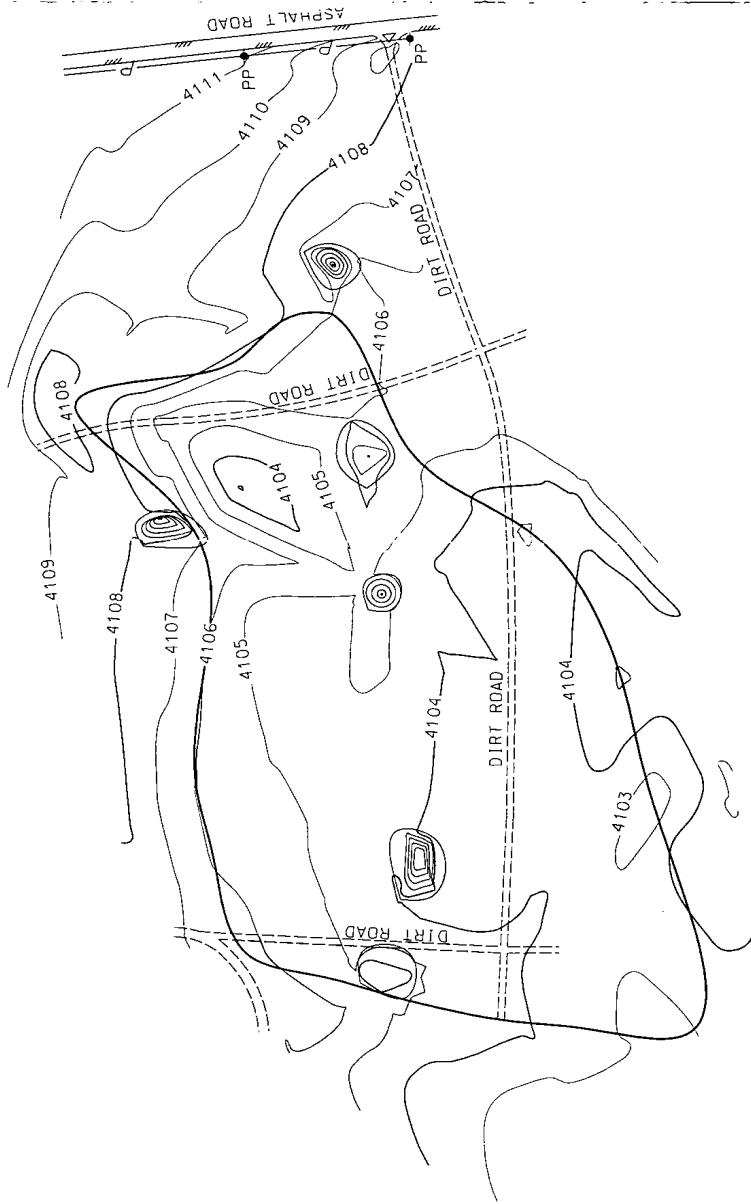


FIGURE 4-2-2  
SECTION 4 - PAGE 16



**LEGEND**

- TOP OF MOUND
- P — POWER LINE
- - - DIRT ROAD
- POSSIBLE EXTENTS OF LANDFILL PER WORKPLAN
- PP ♦ POWER POLE
- ~ 4108 ~ CONTOUR LINE (IN FEET)

SWMU 18  
MCGREGOR RANGE RUBBLE PIT/LANDFILL

<b>THOMPSON PROFESSIONAL GROUP, INC.</b> U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS FORT BLISS MILITARY RESERVATION NEW MEXICO		<b>SITE PLAN</b>	
DESIGNED BY: JAL DRAWN BY: JAL CHECKED BY: JAL CALCULATED BY: JAL	SOIL NO.: CENTER NO.: DATE:	SHEET NO.: DRAWING NUMBER:	SURVEY NO.: SHEET NO.:

Figure 4-2-3  
Section 4 -- Page 17

observed when still active in 1989 as measuring 300 feet long by 50 feet wide and 10 feet deep; however, it was reported that the trench was originally excavated to a depth of 35 feet. No information is given in the reports on the dimensions of any other trenches at this site. The landfill is reported in the RFA to have received sanitary waste, wood, cardboard, plastic, scrap metal, and other material from the McGregor Range Camp.

Plans are not available to indicate how the trenches were constructed; therefore, it is not known whether any attempt was made to compact the native soils lining the bottom of the trench prior to waste placement. The RFA by Kearney states that there are no contaminant release controls constructed at this site. Furthermore, there is no indication from either historical information or from a visual inspection of the area that a leachate collection system exists at this site. The RFA reports that as many as 10 inactive trenches may be located at this site with waste disposal that began in the World War II era. Reportedly, the newest trench began receiving waste in 1983 and was closed and covered in late 1994. This recent trench is reported to have had dimensions of 300 feet long by 50 feet wide by 35 feet deep when it was originally excavated. While the reports on this site do not discuss the manner in which these trenches were oriented within the landfill zone, aerial photographs of the site indicate that the newest trench was constructed with its length parallel to an east-west orientation. The orientations and dimensions of the other trenches at this site are not discussed in any of the historical records; however, common practice at the other SWMU landfills indicates that the trenches would have been constructed parallel and immediately adjacent to each other. Considering the size of this site and the estimated number of trenches that may be located here, there could be several groups of trenches adjacent to each other. One or more trenches could also have been oriented perpendicular to the longitudinal axes of these trench arrays. The historical information indicates that waste placed in these trenches was covered periodically, perhaps as often as monthly. Based on the reports, it appears that this periodic covering gradually reduced the exposed depth of the trench while maintaining the length and width of the active receptacle. Thus, the covered, inactive trenches would consist of a series of compartmentalized waste layers. The thickness of the soil covers could not be determined

from the documents available. In addition, the RFA, which was based in part on a 1989 field visit, states that the area covering the older trenches was slowly re-vegetating. Re-vegetation of this area could reduce the accuracy of any attempt to visually delineate the boundaries of the landfill. Based on the available documentation, interviews with McGregor Range Camp personnel, and a site inspection by Thompson staff, the probable boundary of the rubble pit/landfill area was developed for inclusion into the Workplan for this RFI. This boundary is delineated on the SWMU 18 Site Plan (Figure 4-2-3), and on the Site Grid and Geophysical Survey Map (Figure 4-2-4) which is included in Subsection 4.2.5.

Types of waste reported to be deposited at the site include wood, plastic, cardboard, scrap metal, sanitary waste, kitchen garbage, and miscellaneous rubble.<sup>20</sup> These waste materials were reported to have originated from the activities of McGregor Range Camp personnel. The quantity and quality of the waste have not been investigated prior to this RFI and no records were found to estimate the actual volume and mass of material located at the site. The RFA states that no hazardous waste or constituents were reported to have been placed in these waste units.

In general, this site is set in a desert climate with desert scrub and grass vegetation. There are no nearby surface water bodies or rivers, and any streams are intermittent in nature flowing only during significant rainfall events. The groundwater is reported to be approximately 300 feet from the ground surface, although there may be perched groundwater at lesser depths.<sup>21</sup>

#### 4.2.2. Interim Measures

There have been no known documented interim corrective measures taken in the past at SWMU 18 for mitigation of contamination. Furthermore, no indicators of contamination, such as stressed vegetation or discolored soils, were detected during the course of the field

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<sup>20</sup> Ibid., A.T. Kearney, Inc.

<sup>21</sup> Section 2, Environmental Setting for a General Overview of the Geology and Hydrogeology in this Area.

operations conducted at this site; therefore, no interim measures were implemented following the site investigation.

#### 4.2.3. Site Specific RFI Objectives

The specific RFI objectives for this site are as follows:

1. Determine the number, areal extents, and depths of the waste units present at SWMU 18.
2. Evaluate the thickness and other characteristics of the soil covers in terms of the capping requirements of the New Mexico Solid Waste Management Regulations, EIB/SWMR-4.<sup>22</sup>
3. Assess the susceptibility of the surface soils at the site to erosion.
4. Determine if, and to what extent, a contaminant release from the waste units to the environment has occurred. If such a release has occurred, characterize the nature of that contamination and the potential for further releases, and assess the risk posed by this contamination to potential receptors in the vicinity of the site.
5. Record and map the precise location of all survey points delineating the site and all sampling points established during this investigation.
6. Construct two permanent bench mark monuments tied to the New Mexico State Plane Coordinate System and referenced to the current North American Datum (NAD) so that the site and all recorded survey points may be readily located in the future.

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<sup>22</sup> New Mexico Environment Department, Solid Waste Bureau, New Mexico Solid Waste Management Regulations, EIB/SWMR-4, July 18, 1994.

#### 4.2.4. Data Collection Plan

Four distinct but interrelated tasks comprise the data generation effort at this site: geophysical survey, soil gas sampling, trench excavation, and soil boring. The results of the geophysical survey using GPR, EM, and magnetometry methods were to be used to establish the number, boundaries, and depths of the waste trenches, and to provide a basis for locating the soil gas sampling points. Data generated from the soil gas sampling program, in combination with the results from the geophysical studies, were then to provide a basis for optimizing the location of the trench excavation and the siting of soil borings. The selection of the optimal location for the excavation of the waste trench and visual inspection of the waste mass was to be based on obtaining the most representative sampling of the buried materials and on inspecting any waste items of particular interest, such as waste drums. Technical details on the procedures to be used in completing each of these four tasks are located in Section 3.

Table 4-2-1, which follows this subsection, summarizes the planned data collection effort for this site as envisioned in the RFI Workplan. Per the Workplan, a minimum of two soil gas sampling points was to be allocated to each waste trench identified by the geophysical survey. Based on the prior information concerning the number of waste trenches that might be present at this site, a total of 24 sampling points were allocated among the trenches. A total of seven soil borings were planned for SWMU 18 with one of the borings to be drilled at an angle such that the boring terminated beneath a waste trench. As with the soil gas sampling points, the locations of these borings were to be determined based on the results of the geophysical survey. In addition, the results of the soil gas survey would be reviewed to optimize placement of the borings.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O <sub>2</sub> )	Hydrogen Sulfide <sup>1</sup>
Soil: Surface Borings <sup>2</sup>	49	X	X	X	X				
Rinsate	1	X	X	X	X				
Split	5	X	X	X	X				
Soil Gas	24	X <sup>1</sup>				X	X	X	X
<sup>1</sup> Field tested									
<sup>2</sup> 7 borings to 50' depth. Samples at 0', 5', 10', 20', 30', 40', & 50'									

Table 4-2-1 - SWMU 18 Proposed Number of Samples and Parameters

#### 4.2.5. Investigation & Sampling Summary

The field investigation of SWMU 18 consisted of the following activities: layout of the coordinate grid as a basis for conducting the geophysical survey and subsequent sampling procedures; the geophysical survey to locate and determine the extents of the waste units; the soil gas survey to detect zones of possible VOC contamination; the trench excavation to characterize the buried wastes; and, soil boring to recover chemical and geotechnical samples for laboratory analysis and to log the geologic strata beneath the surface of the site.

##### 4.2.5.1. Coordinate Site Grid

The x-y coordinate grid was established with the y-axis oriented to the north with the origin anchored at the permanent bench mark designated as 18BM1 (refer to the Site Grid and Geophysical Survey Map, Figure 4-2-4, which follows this page). This grid provided site control for the geophysical survey and all subsequent site activities. Based on the size of the area to be surveyed and the capabilities of the geophysical equipment, the grid nodes were established every 40 feet in the x-direction and every 100 feet in the y-direction.



#### 4.2.5.2. Geophysical Survey

The geophysical survey was performed by Golder Associates using EM-31, magnetometry, and GPR techniques as described in Section 3 of this Report. A complete discussion of the geophysical investigation of SWMU 18 is included as Section 5.1 in the Final Report from Golder Associates included as Appendix 2 in this RFI Report. Briefly, the geophysical equipment was deployed, beginning with EM-31 electromagnetics along north-south transect lines spaced every 40 feet along the x-axis of the site grid. The original grid, constructed prior to the arrival of the geophysical team on site, was modified as necessary by Thompson field personnel as the results of the survey were reviewed and enlargement of the survey area became advisable. Following the completion of the EM-31 phase of the survey, the magnetometry and GPR methods were deployed. When the results of all three methods have been evaluated, a site map, referenced to the control grid, delineating the waste trench zones and other pertinent site features, was prepared to provide a basis for locating all subsequent investigative activities (see Site Grid and Geophysical Survey Map, Figure 4-2-4). The results of the geophysical survey are discussed in Subsection 4.2.6.1, Unit Characterization.

#### 4.2.5.3. Soil Gas Survey

Utilizing the results of the geophysical survey, a soil gas sampling survey was conducted to delineate zones of VOC contamination. Soil gas sampling was conducted at 24 points at SWMU 18. Sampling locations exhibiting relatively high VOC concentrations, as indicated by the PID instrument, were given priority when selecting locations for soil boring. Gas samples were submitted for chemical laboratory analysis when the PID screen registered VOC concentrations greater than 10 ppm. The results of samples submitted for chemical laboratory analyses are included in Appendix 11 of this Report. Table 4-2-2, located at the end of this section, lists the sample grid locations and the results of the field PID screening. A complete record of each soil gas

sampling event is included in Appendix 7. The methodology and equipment used to perform this survey are discussed in Section 3 of this Report. The locations of the soil gas sampling points are depicted on the Site Sampling Location Map (Figure 4-2-5) which is included in Subsection 4.2.5.5.

Sample Number	Grid Location	PID Reading (ppm)	Laboratory Sample Taken?
SG18-1	63N/70W	1.3	N
SG18-2	50N/240W	2.0	Y
SG18-3	33N/350W	90	Y
SG18-4	69N/450W	5.6	N
SG18-5	19N/583W	9.6	N
SG18-6	20N/665W	9.2	N
SG18-7	21N/756W	8.5	N
SG18-8	22N/952W	9.0	N
SG18-9	28S/915W	7.0	N
SG18-10	103S/817W	7.4	N
SG18-11	182S/846W	8.7	N
SG18-12	224S/883W	9.0	N
SG18-13	248S/714W	6.8	N
SG18-14	121S/662W	1.3	N
SG18-15	73S/597W	27.0	Y
SG18-16	130N/837E	0.5	N
SG18-17	218N/558E	6.8	N
SG18-18	279N/397W	6.8	N
SG18-19	175S/550W	6.8	N
SG18-20	265S/557W	8.8	N
SG18-21	355S/600W	14.0	Y
SG18-22	382N/120W	11.9	Y
SG18-23	166N/96W	6.4	N
SG18-24	315N/237W	9.6	N

Table 4-2-2 - SWMU 18 Soil Gas Sampling Results

#### 4.2.5.4. Trench Excavation

An observation pit was excavated into the waste mass at a single trench location in order to examine the waste contents and to confirm data gathered during the geophysical survey concerning the depth of the trench and the thickness of the trench cover. The choice of location for this excavation was based on information generated during the geophysical survey and from the PID screening data resulting from the soil gas survey. A location where the soil gas PID field screening produced a relatively high VOC gas concentration was selected so that the potential existed for encountering the source of the soil gases during the excavation (refer to the Site Sampling Location Map, Figure 4-2-5, to reference the location of the observation trench). The methodology employed to excavate and examine the trench is included in Section 3 of this Report. The data gathered during the trench excavation provides the basis for Subsection 4.2.6.2., Waste Characterization.

#### 4.2.5.5. Soil Boring and Sampling

Following completion of the trench excavation, the results of all previous site investigative activities were reviewed in order to select the optimum locations for the soil borings to be drilled at SWMU 18. The locations were selected to yield an areal and directional representation of any subsurface contamination while being situated reasonably close to the waste cells in order to intercept any migrating contamination.

Seven soil borings were originally allocated to this site when the RFI Workplan was developed; however, two additional borings were allocated to this site after it was determined that no borings would be drilled at SWMU 29. Thus a total of nine borings were drilled at this site. Eight of the borings were drilled vertically while one was drilled at an angle of 30 degrees from vertical. The methodology used for soil boring and sampling is included in Section 3 of this Report. The locations of the borings may be referenced on the Site Sampling Location Map (Figure 4-2-5) which follows this page. In addition to the nine soil boring locations illustrated on the map, a tenth

location labeled GT18-10 references the site of the geotechnical sample recovered to evaluate the properties of trench cover material. Detailed information on each of the nine soil borings is included in Appendix 3, Soil Boring Logs.

Table 4-2-3, which follows, presents a summary of the sampling effort expended at this site. For the sample depths and descriptions of the soil at the sampling points, please refer to the soil boring logs in Appendix 3.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O <sub>2</sub> )	Hydrogen Sulfide <sup>1</sup>
Soil: Surface Borings <sup>2</sup>	63	X	X	X	X				
Rinsate	2	X	X	X	X				
Split	7	X	X	X	X				
Soil Gas	24	X <sup>1</sup>				X	X	X	X
<sup>1</sup> Field tested									
<sup>2</sup> 9 borings to 50' depth, Samples at 0', 5', 10', 20', 30', 40', and 50'									

Table No. 4-2-3 - SWMU 18 Actual Number of Samples and Parameters

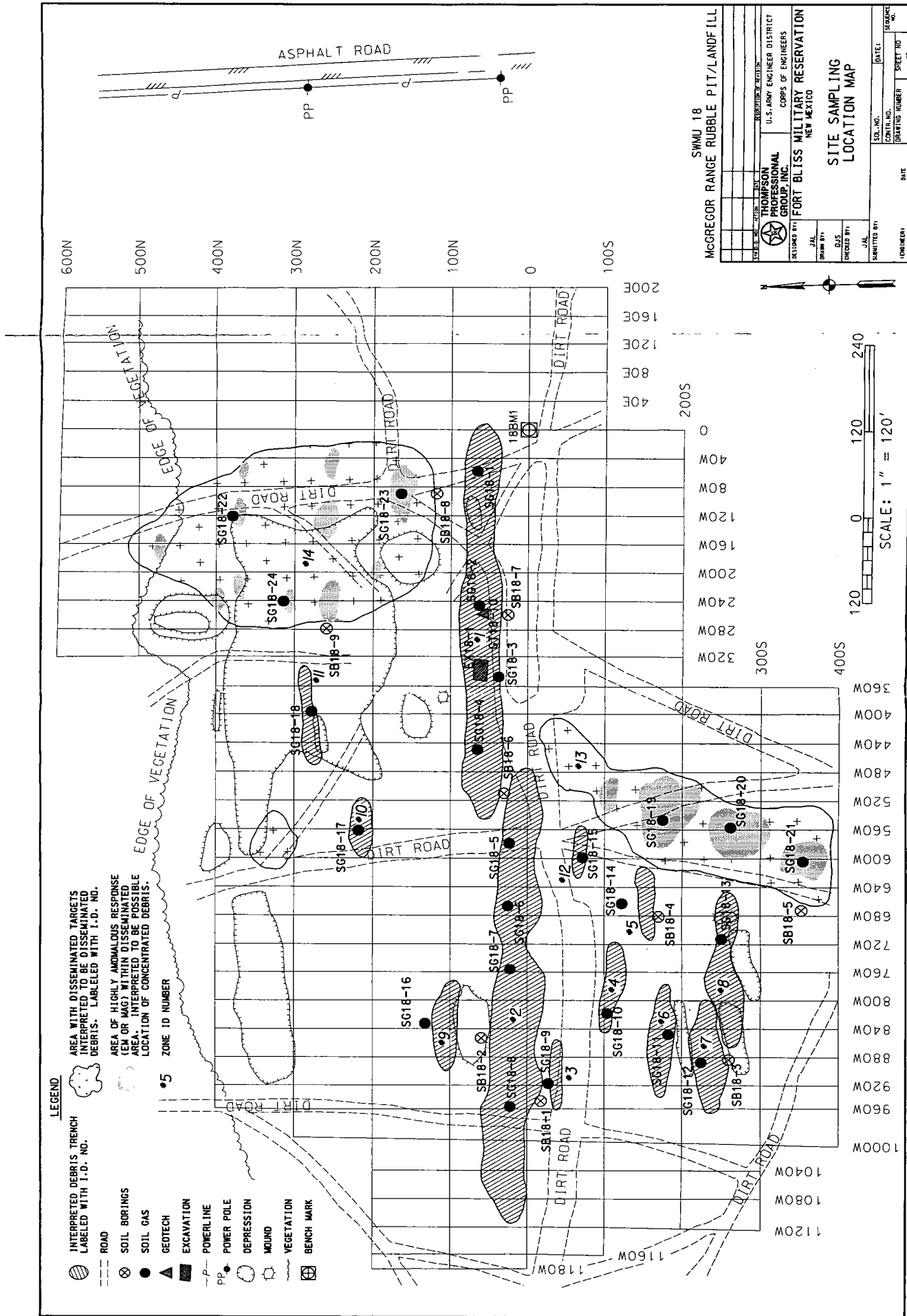


Figure 4-2-5  
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#### 4.2.6. Results of Investigation-Findings

The following discussion presents the pertinent findings of the investigative activities conducted at SWMU 18.

##### 4.2.6.1. Unit Characterization

Based on the results of the geophysical survey, and supported by data from the trench excavation, SWMU 18 appears to consist of two major and nine minor waste trenches and two zones of concentrated buried debris not confined to a trench. The 11 waste trenches are oriented parallel to each other in an east-west direction along their major longitudinal axes, as was postulated in the Workplan for this RFI. The number of trenches detected is also consistent with the RFA report by Kearney.<sup>23</sup> The Site Grid and Geophysical Survey map, included earlier, displays the results of the geophysical survey in plan view. A detailed discussion of the geophysical survey conducted at this site along with additional supporting maps is included in the Final Report produced by Golder Associates, included as Appendix 2 to this Report.

The two major waste trenches, #1 and #2, are approximately 560 feet and 640 feet in length, respectively. The widths of these two units vary from 30 feet to 70 feet. The nine minor trenches vary from 80 feet to 220 feet in length and from 20 feet to 40 feet in width.

As explained in the geophysical report, the effort to establish the depths of the waste trenches was frustrated by poor penetration of the GPR signal and interference from debris within the trenches. The depth of penetration of the GPR signals is partially dependent on the electrical properties of the soils. This depth may be significantly inhibited in soils containing fine-grained sediments such as silts and clays. As a result, GPR was only able to estimate the minimum trench depths along the transects where the

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<sup>23</sup> Ibid., A.T. Kearney, Inc.

GPR was deployed. With this clarification, the minimum detected depths of the two major trenches varied from 6 feet to 11 feet, with those depths of the minor trenches varying from 7 feet to 14 feet.

The estimated thickness of the trench covers, as measured by GPR, varied from a minimum of 2 feet to greater than 5 feet. A trench excavation was conducted at waste unit #1 at a grid x-coordinate of approximately 340W. The thickness of the cover observed during the excavation varied between 2 feet and 3 feet. The detected thickness of the cover at the GPR transect closest to excavation, 360W, was 2.5 feet, lending credence to the cover thickness results produced by the GPR survey. *Handwritten: 2.5 ft. and 3 ft.*

Based on a visual inspection of the site, the trench covers do not appear to meet the requirements of the New Mexico Solid Waste Bureau regarding side slope gradients. Section 502, Closure and Post-Closure Requirements for Cover Systems for Municipal or Special Waste Landfills of the New Mexico Solid Waste Management Regulations, specifies that a landfill cover have side slopes equal to, or less than, 25% grade, 1 foot vertical per 4 feet horizontal, and that the top portion of the cover shall have a gradient of between 2% to 5%, sufficient to prevent ponding of water and erosion of the cover.<sup>24</sup> While the characteristics of the covers may present a problem for ponding of water, the potential for erosion at the site appears to be negligible. The site is nearly flat with an average gradient of approximately 0.5%, declining from the northeast to the southwest (Refer to Figure 4-2-3). Localized areas of the site with much steeper gradients lie away from the waste trench zone and are relatively well vegetated.

#### 4.2.6.2. Waste Characterization

Data on waste characterization for SWMU 18 was derived from the trench excavation. The location of the excavation, identified as EX18-1, may be referenced on the Site

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<sup>24</sup> Ibid., New Mexico Environment Department, Solid Waste Bureau.

Sampling Location Map (Figure 4-2-5). The results of the excavation are presented in tabular form as follows:

Depth Interval (ft.)	Waste Description
0 - 2	Trench cover: silty clay - sandy, tan
2 - 3	Field communications wire, beer cans, plastic sheeting, garbage bags
3 - 4	Used tires, inner tubes, vehicle exhaust muffler and tail pipe, plastic garbage bags, carpet
4 - 5	Wood boards, plastic sheeting, cardboard, metal container, miscellaneous kitchen waste
5 - 7	Wood, cans, plastic, kitchen waste, dark discolored soil - very strong oily odor
7 - 9	Copper tubing, wood, plastic trash bags
9 - 11	Old military aerosol pesticide can (identified by UXO specialists), misc. Rubble identified at shallower depths
11 - 13	Used T-ration and MRE containers, barbed wire, plastic garbage bags, communications wire
13 - 16	(same type items as 11' - 13' depth)

Table 4-2-4 - SWMU 18 Waste Trench Excavation

With the exception of the discolored, odorous soil noted at the 5 feet to 7 feet depth interval, the types of waste observed during the excavation are consistent with those included in the historical records mentioned in Subsection 4.2.1. The discolored soil was dark gray to black and very sandy in texture, and apparently was placed into the trench as waste since it differed characteristically from the soils surrounding the trench and was discovered amidst other waste items. This mass of soil exuded a very strong, oily odor when it was removed from the excavation. The soil was scanned at the surface with the Bacharach air monitor producing a carbon monoxide reading of 40 ppm. It was theorized by personnel present at the excavation that the soil might have been contaminated with hydrocarbon products at a location such as a vehicle maintenance area, removed from that location, and placed in this waste unit.

#### 4.2.6.3. Sampling Results

The results of the chemical laboratory analyses of soil samples collected from SWMU 18 are contained in Appendix 11 of this RFI Report. Table 4-2-5, Analytical Results, presents a listing of samples where a chemical constituent was detected by the laboratory at a level exceeding the estimated background concentration for that particular compound. The data evaluation and validation methodology is discussed in Subsection 4.1. Tables documenting the data validation and evaluation processes are included in Appendices 8 and 9, respectively.

The results of soil samples submitted for geotechnical laboratory analyses are presented in Table 4-2-6. The complete geotechnical laboratory report is included as Appendix 5 to this Report.

None of the constituent concentrations of metals detected, and only one of the constituent concentrations of organics detected (toluene), is of an order of magnitude greater than the related background concentrations. For the tabulated metals, the exceedances of background concentration may be explained by geochemical variation in the sampling location versus the background location. Toluene contamination appears to have been detected in sample SB18-7-7 (0.15 mg/kg vs. 0.006 mg/kg background), which interestingly was collected from the 50 feet depth of the sole angle boring at this site. Thus, the in-situ position of the soil sample would have been directly beneath waste trench #1. It is a matter of qualitative judgment whether the other organic exceedances listed in Table 4-2-5 represent significant levels of contamination.

Sample Number	Depth Interval (ft.)	Parameter	CAS Number	Results (mg/Kg)	Estimated Background Concentration (mg/Kg)	Percent Exceedence of Background	Risk-Based Concentration <sup>1</sup> (mg/Kg)	Exceeds Risk-Based Concentration?
SB18-1-1	0-2	Selenium ✓	7782-49-2	3.00	0.70	429	390	No
SB18-1-1	0-2	Barium ✓	7440-39-3	235	184.4	127	5500	No
SB18-1-1	0-2	Cadmium ✓	7740-43-9	4.20	1.7	247	39	No
SB18-1-1	0-2	Silver ✓	7440-22-4	4.50	1.7	265	39	No
SB18-3-1	0-2	Barium ✓	7440-39-3	209	184.4	113	5500	No
SB18-4-4	20-22	Carbon Disulfide ✓	75-15-0	0.007	0.0059	119	7800	No
SB18-5-2	5-7	Barium ✓	7440-39-3	341	184.4	185	5500	No
SB18-7-2	5-7	Barium ✓	7440-39-3	284	184.4	154	5500	No
SB18-7-7	50-52	Toluene	108-88-3	0.150	0.0059	2542	16000	No
SB18-8-3	10-12	Carbon Disulfide ✓	75-15-0	0.006	0.0059	102	7800	No
SB18-8-5	30-32	Arsenic ✓	7440-38-2	10.1	9.2	110	23	No
SB18-8-6	40-42	Lead ✓	7439-92-1	19.2	16.2	119	400 <sup>2</sup>	No
SB18-9-6	40-42	Arsenic ✓	7440-38-2	10.5	9.2	114	23	No
SB18-9-6	40-42	Lead ✓	7439-92-1	20.2	16.2	125	400 <sup>2</sup>	No

<sup>1</sup>Values are from EPA Region 3 Risk-Based Concentrations for Soil Ingestion - Residential, unless otherwise noted (see Appendix 10).

<sup>2</sup>Derived from the U.S. EPA Region IX Preliminary Remediation Goals, Second Half 1995, September 1, 1995 (see Appendix 10).

Table 4-2-5 - SWMU 18 Analytical Results

The data validation process identified one sample cooler, containing samples collected on November 5, 1996, that arrived at the laboratory with a temperature of 7°C, which is out of the control limits of 4°C plus or minus 2°C. Elevated temperatures in sample coolers may cause the actual sample concentrations for organic constituents to be under-reported, or for cross contamination between the samples placed in the same cooler to occur. This particular temperature variance is only slightly above of the upper control limit of 6°C, and the samples shipped in this cooler do not show any differences in the organic analyte concentrations from the other samples collected at this sight. Therefore, it is reasonable to conclude the data obtained from the analysis of the samples shipped in this cooler are not harmed by this temperature variation. Furthermore, it has been determined that the other data collected from this sight is reliable, and representative of the conditions at the time of the investigation at SWMU 18.

None of the detected sample constituent concentrations that exceeded background levels equaled or exceeded the related Risk-Based Concentrations.

The results of the geotechnical soil sample, GT18-10, collected from the cover material of trench #1 merits discussion. The reported permeability, or saturated hydraulic conductivity, is 1.47E-05 cm/s. Section 502, Closure and Post-Closure Requirements for Cover Systems for Municipal or Special Waste Landfills, of the New Mexico Solid Waste Management Regulations specifies that a landfill cover have an infiltration layer at least 18 inches thick with a saturated hydraulic conductivity equal to, or less than, 1E-05 cm/s, or that the conductivity be less than the natural subsurface soils surrounding the landfill.<sup>25</sup> Although the cover material tested as GT18-10 has a higher conductivity than the native soils, as evidenced by the results of the other geotechnical samples

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<sup>25</sup> Ibid., New Mexico Environment Department, Solid Waste Bureau.

tested, the magnitude of the conductivity is reasonably equivalent to the stated level of 1E-05 cm/s.

Sample ID	Depth (ft.)	Moisture Content (%)	Dry Unit Weight (lbs/ft <sup>3</sup> )	Permeability (cm/s)	Organic Content (%)	pH Soil/Solid	CEC (meq/100g)
GT18-1-1	0 - 2	7.2	102	4.29E-05	0.74	9.4	11.7
GT18-1-2	22 - 24	7.5	109	5.32E-06	0.27	9.8	14.5
GT18-1-3	32.5 - 34	2.5	107	6.49E-05	0.30	9.5	4.0
GT18-3-1	52 - 53.5	11	119	1.36E-07	1.19	9.7	33.5
GT18-10	0 - 2	7.7	81	1.47E-05	0.88	9.3	16.3

Table 4-2-6 - SWMU 18 Geotechnical Results

#### 4.2.7. Contaminant Characteristics

The only analyte found to be significantly above the background concentration was toluene in sample SB18-7-7 (50 ft. depth), at a concentration of 0.15 mg/Kg, but significantly below the EPA Region III risk-based concentration of 16,000 mg/kg. Toluene is an aromatic hydrocarbon also known as methylbenzene or phenyl methane, CAS Number 108-88-3, and a chemical formula of  $C_6H_5CH_3$ . Common uses include manufacturing (benzoic acid, explosives and dyes), and in solvents for paints, lacquers, and resins, and as a fuel additive.<sup>26</sup>

The physical properties are as follows: colorless liquid, benzene-like odor, density 0.866 (4°C), freezing point -94.5°C, boiling point 110.7°C, flash point 4.4°C, autoignition temperature 536°C, soluble in alcohol, benzene, and ether, insoluble in water.<sup>27</sup>

<sup>26</sup> Spectrum Laboratories, Chemical Fact Sheet - CAS #108883; <http://www.speclab.com/compound/c108883.htm>.

<sup>27</sup> Sax, N. Irving and Richard J. Lewis, Sr., Hawley's Condensed Chemical Dictionary, 11<sup>th</sup> ed., van Nostrand Reinhold, 1987.

The partitioning characteristics are as follows: water solubility  $5.35\text{E}+02$  mg/L; vapor pressure  $3.70\text{E}-02$  atm; Henry's Law constant,  $K_H$ ,  $6.37\text{E}-03$  atm.m<sup>3</sup>/mol; and the organic carbon partition coefficient,  $K_{OC}$   $3.00\text{E}+02$  L/kg.<sup>28</sup>

Toluene released into the soil is lost by evaporation and leaching to the groundwater. Biodegradation can occur in both soil and groundwater, though it may be toxic to microorganisms. Acclimated microbial populations may allow rapid biodegradation. Toluene does not significantly hydrolyze in soil or water and is relatively mobile in soil, and it is possible under normal conditions for it to migrate into groundwater.<sup>29</sup>

Based on the data available at this stage of the RFI, it is not possible to characterize the level or extent of toluene contamination at this site.

#### 4.2.8. Potential Receptor Identification

SWMU 18 is located in a remote area on a vast military installation in an arid desert. This site is part of the McGregor Range Camp, and only the range camp cantonment is populated. Human access to the site and adjacent lands is restricted to military personnel working or residing at the McGregor Range Camp, other military personnel in the area during training exercises, civilians and military personnel engaged in hunting activities, and civilian contractors working on projects for the military. Since the SWMU is located on a military installation, it is assumed that public access is generally restricted; however, there are no physical barriers to prevent unauthorized personnel from entering this area, and Range Camp personnel report that such unauthorized entry is not uncommon.

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<sup>28</sup> Mercer, J.W. and R.M. Cohen, "A review of immiscible fluids in the subsurface: properties, models, characterization and remediation," Journal of Contaminant Hydrology, 6, 107-163, 1990, summarized by Randall J. Charbeneau, Groundwater Pollution and Transport, University of Texas at Austin, 1994.

<sup>29</sup> Spectrum Laboratories: Chemical Fact Sheet - CAS #108883;<http://www.speclab.com /compound/c108883.htm>.

Previous well tests at McGregor indicated that the groundwater at this site did not have an adequate yield or quality for use as potable water for the facility.<sup>30</sup> There are no surface water bodies in the vicinity of the site except for SWMU 19 which is a wastewater oxidation pond serving the McGregor Range Camp.

The scope and depth of information needed on the population of potential receptors and the relative risk to those receptors are directly related to whether contamination is confirmed, and at what concentration level it is confirmed, and the potential for exposure based on a developed model for the migration of such contamination. According to the Workplan for this RFI, if it is determined that contaminants exist at this site at levels that exceed EPA Region 3 Risk-Based Concentrations (RBCs) at a statistically significant level of confidence, then a baseline qualitative Human Health Risk Assessment (HHRA) will be performed at this site. This HHRA would be performed utilizing guidance as provided by the EPA documents *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)*<sup>31</sup> and *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual Supplemental Guidance*.<sup>32</sup> None of the samples collected from SWMU 18 exhibited levels of contamination equal to, or greater than, the relevant RBCs. Therefore, no HHRA has been, or is scheduled to be, performed at this time.

Another aspect of risk assessment is an ecological risk assessment, which in many ways is more complex than a HHRA. This is due, in large part, to the need to evaluate multiple species, the level of ecological structure to be considered (species,

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<sup>30</sup> Rapp, John R., Summary of Test Drilling and Ground-Water Conditions in the McGregor Range Area, Otero and Dona Ana Counties, New Mexico and El Paso County, Texas, USGS, October 1957.

<sup>31</sup> USEPA Office of Solid Waste and Emergency Response, Toxics Integration Branch, Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual Supplemental Guidance, OSWER Directive 9285:6-03, Washington, DC, 1991.

<sup>32</sup> USEPA Risk Assessment Forum (February), Framework for Ecological Risk Assessment, EPA/630/R-92/001, Washington, DC, 1992.

populations, ecosystems, etc.), and the less well-established bench marks for chronic toxicity, etc. The process for conducting a screening-level ecological risk assessment (SERA) was discussed in the Workplan for this RFI and will not be repeated here.<sup>33</sup>

No visible signs of stressed vegetation were apparent at the site. By the nature of the activities that have taken place at this site, the surface area where the waste trenches were constructed has been impacted, and the appearance is markedly different from the surrounding undisturbed area. However, the disturbed area is revegetating.

At this stage in the RFI process, based on a qualitative review of the types, concentrations and locations of contaminants detected at this site, the additional expense that would be experienced by conducting an extensive risk assessment is not warranted.

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<sup>33</sup> Ibid., USEPA Risk Assessment Forum.



#### 4.3. SWMU 20 - McGregor Range Open Detonation Area

Solid Waste Management Unit (SWMU) 20 is known as the Inactive McGregor Range Open Detonation Area and is also identified as FTBL-015. The site is located approximately one-half mile northeast of the McGregor Range Camp and due north of the Fire Fighting Training Area (SWMU 21). The Range Camp is located on the Fort Bliss Military Reservation which covers approximately 1.2 million acres of land in New Mexico and Texas near El Paso, Texas.<sup>34</sup> The site is located in the New Mexico portion of the Fort Bliss Military Reservation within the Hueco Basin of the New Mexico Highland section of the Basin and Range province approximately 30 miles north of El Paso.<sup>35</sup> An Aerial Photograph (Figure 4-3-1) of the site is located on the following page.

The Site Location Map (Figure 4-3-2) shows the general location of SWMU 20 relative to other SWMUs situated in and around the McGregor Range Camp area and is located after the Aerial Site View.

##### 4.3.1. Unit Description and Characteristics

SWMU 20 is an open detonation area that consists of two primary pits located in a larger zone that is littered with debris.<sup>36</sup> SWMU 20 is currently inactive, but was operated by Fort Bliss on land owned by the Bureau of Land Management. The specific topography of the site is depicted on the SWMU 20 Site Plan (Figure 4-3-3) located on the following pages. The RFA report by Kearney, the USAEHA Final

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<sup>34</sup> A.T. Kearney, Inc., RCRA Facility Assessment PR/VSI Report: U.S. Army Air Defense Artillery Center and Fort Bliss, Texas, Prepared for the U.S. Environmental Protection Agency, Chicago, IL, 1989.

<sup>35</sup> Section 2, Environmental Setting for a general overview of the geology and hydrogeology in this area.

<sup>36</sup> Thompson Professional Group, Inc., Site Visit Field Notes, Houston, TX, January 1996.

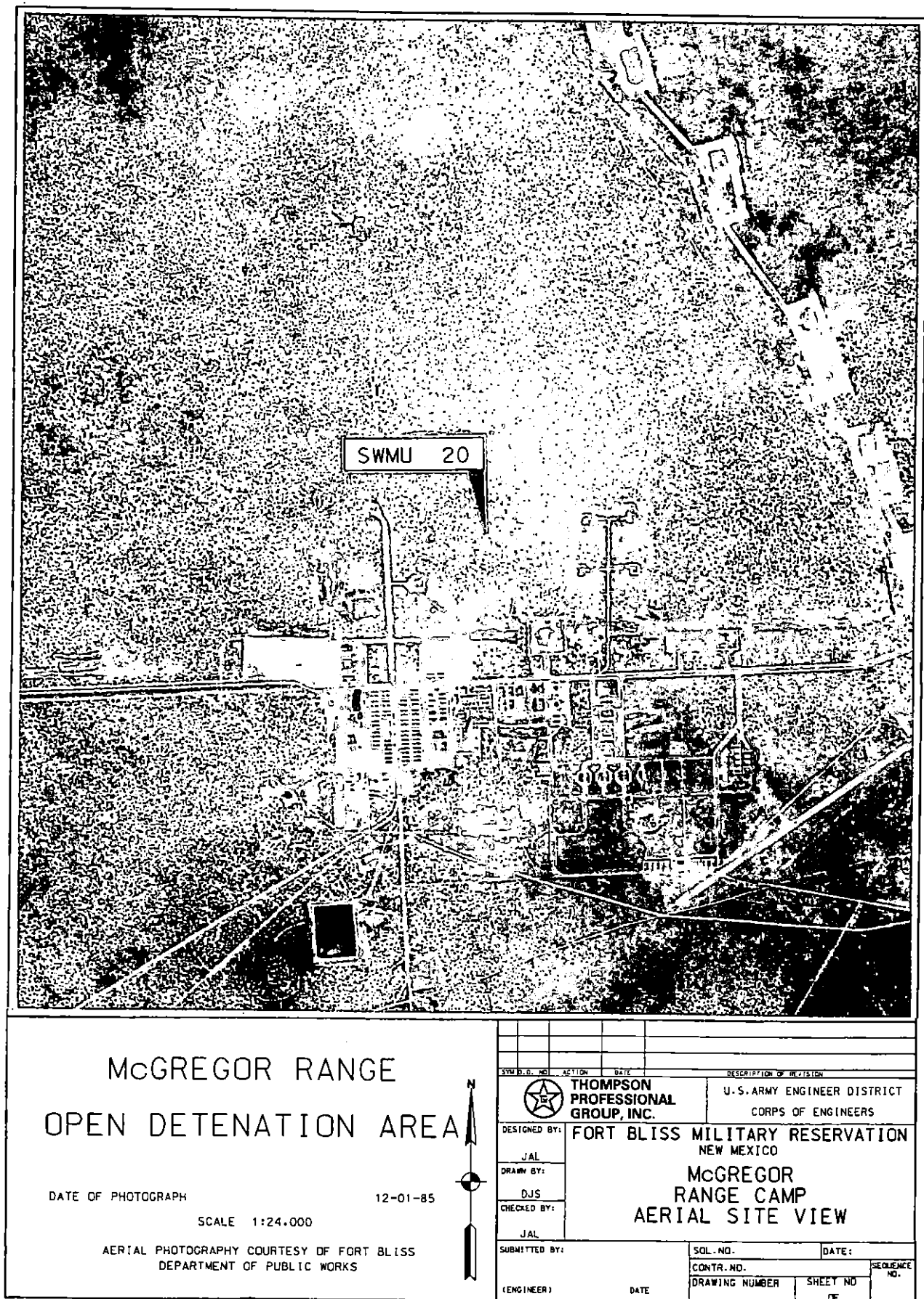


Figure 4-3-1  
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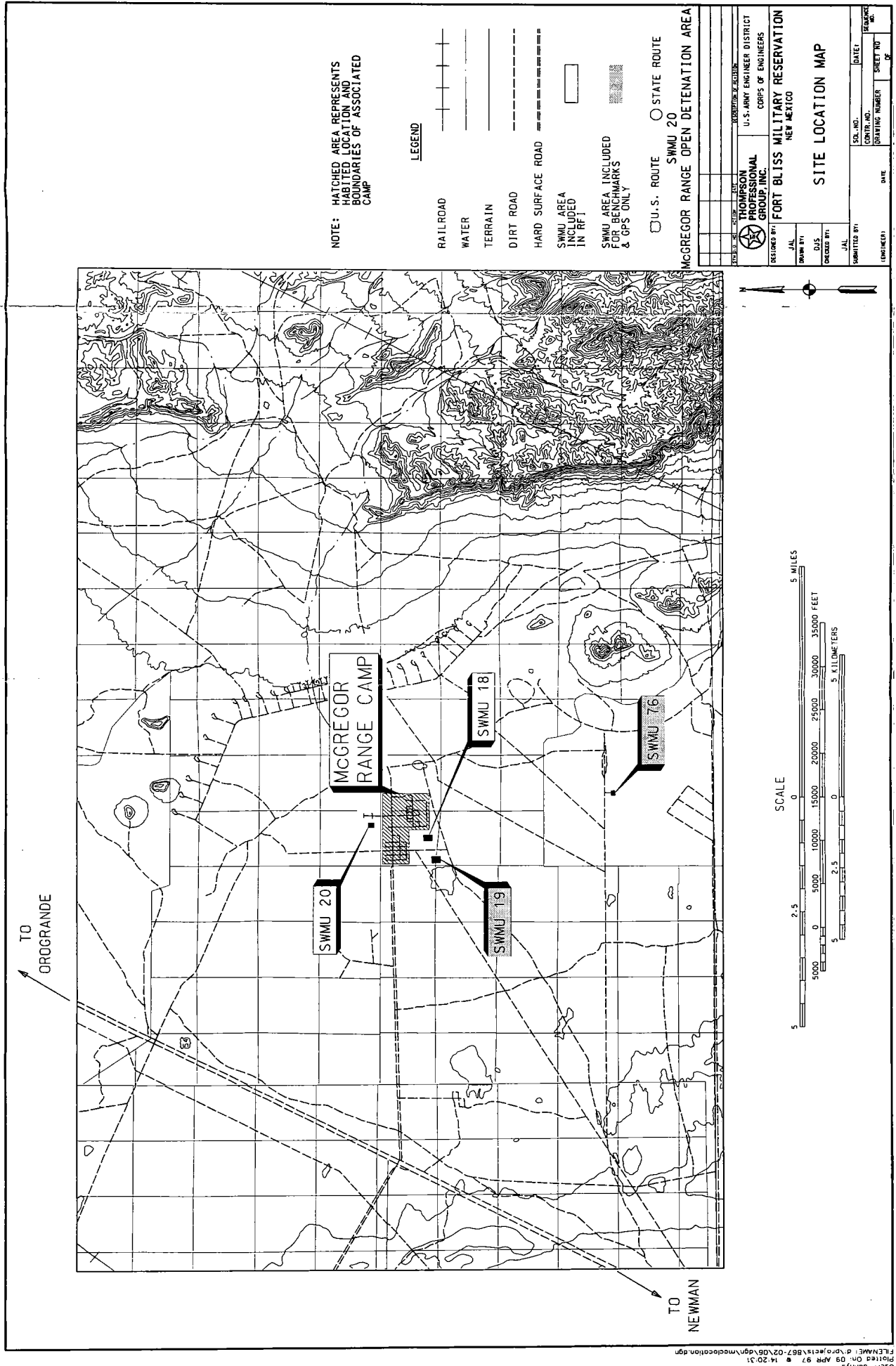
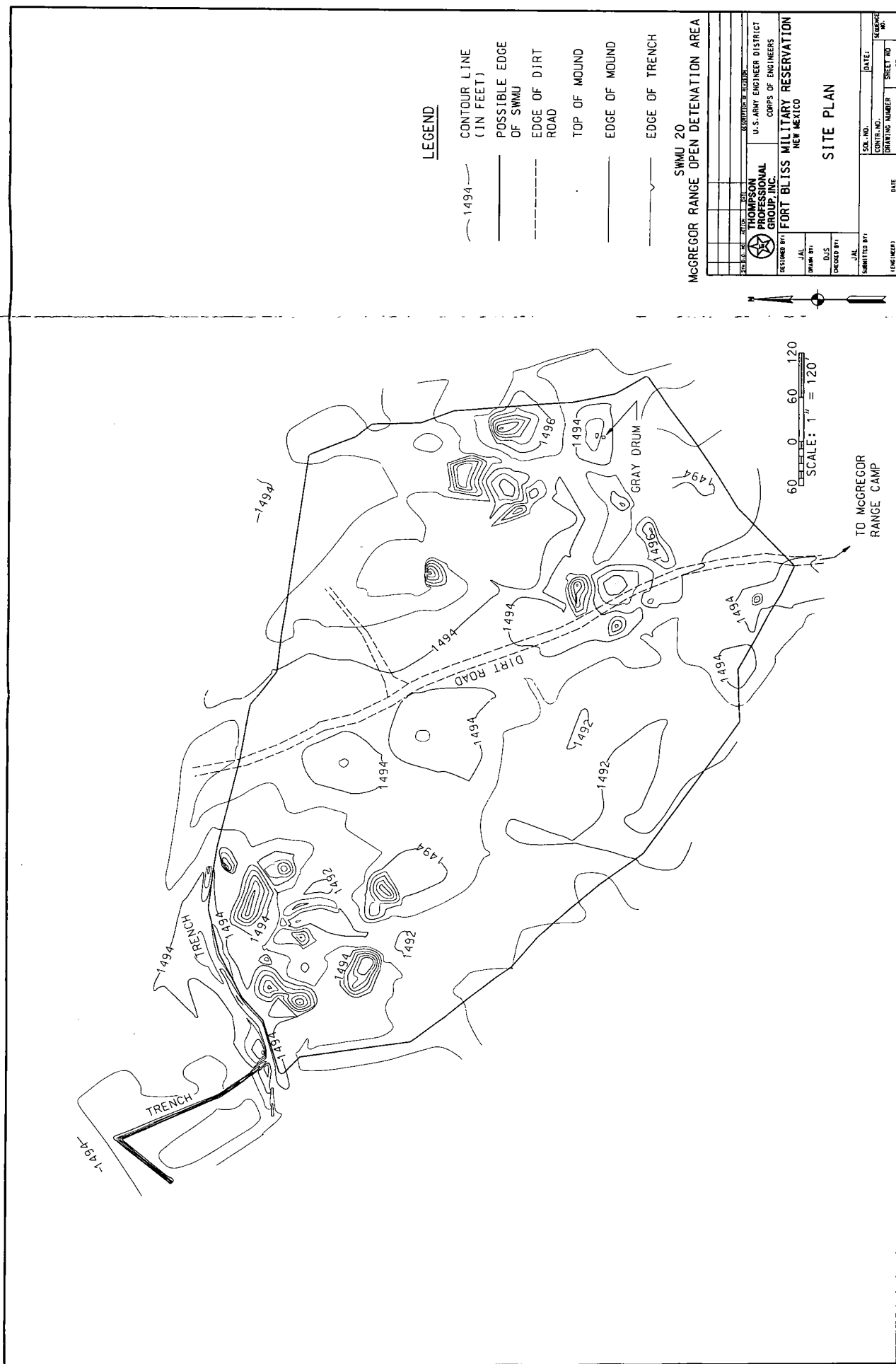


Figure 4-3-2  
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Report<sup>37</sup> and the USACE Contract Document<sup>38</sup> describe the site as having been used for the detonation of explosive materials up to about 1958 and as containing scrap metal and other components from old Nike missiles in addition to the explosive materials.

At the initiation of Workplan development for this RFI, the exact location of this site was not known. It was later identified for Fort Bliss personnel on December 20, 1995, by Mr. Wayne Brendt, an amateur historian and archeologist, who is active in the Fort Bliss area and who served in the military at Fort Bliss. Mr. Brendt estimated the active period of SWMU 20 to be from 1955 to 1965 based on the types of debris observable at the site, primarily components from both Nike Ajax and Hawk missiles. According to Mr. Brendt, Nike and Hawk missiles were sent to this site for destruction because they were defective, old, or obsolete.

The densest concentration of debris is located in a shallow depression that is irregularly surrounded by a series of earthen mounds. This major pit area, occupying roughly one acre, is located approximately 500 yards northwest of the entrance to the fuel storage area. The remains of fiberglass nose cones from Hawk missiles, miscellaneous fiberglass fuselage scraps, and metal drums dominate the types of waste found in this area.

A second, smaller, pit area is located about 200 yards southeast of the main pit. This 100-foot by 100-foot area also features a depression irregularly surrounded by earthen mounds. Fiberglass and metal missile debris are concentrated in this area in comparison with the terrain immediately adjacent to the depression.

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<sup>37</sup> U.S. Army Environmental Hygiene Agency, Final Report, Hazardous Waste Consultation No. 38-26-1647-90, Evaluation of Solid Waste Management Units, Fort Bliss, Texas, August 3-7, 1987 & September 26-29, 1989.

<sup>38</sup> Ibid., U.S. Army Environmental Hygiene Agency.

Metal and fiberglass missile components appear at the surface outside of the two pit areas in a zone encompassing roughly 10 acres, oriented northwest to southeast between the two pits. Concentrations of debris vary widely in this area; however, the densest concentrations appear to the southeast of the main pit. The components range in size from 4 to 5-foot sections of partially destroyed missile fuselages to postage stamp size scraps of electronic devices. Other areas, particularly along the northern perimeter and to the east of the dirt access road, are largely devoid of missile debris.

Features appearing in the general area of the site, including a network of shallow trenches adjacent to the north and west of the main pit and several sand-bagged foxholes, indicate that this locale has been used in the past for military training exercises. Expended light arms practice rounds appear strewn about the surface throughout the site and adjacent areas.

In general, the limits of the site cannot be defined by use of some obvious physical feature. The limits of the site, indicated on the maps accompanying this subsection, were developed by observing missile debris found at the surface. This site is set in a desert climate with desert scrub and grass vegetation. There are no nearby surface water bodies or rivers, and any streams are intermittent in nature flowing only during significant rainfall events. The groundwater is reported to be approximately 300 feet from the ground surface, although there may be perched groundwater at lesser depths.<sup>39</sup>

#### 4.3.2. Interim Measures

There have been no known documented interim corrective measures taken in the past at SWMU 20 for mitigation of contamination. Furthermore, no indicators of contamination, such as stressed vegetation or discolored soils, were detected during the

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<sup>39</sup> Section 2, Environmental Setting for a General Overview of the Geology and Hydrogeology in this Area.

course of the field operations conducted at this site; therefore, no interim measures were implemented following the site investigation.

#### 4.3.3. Site Specific RFI Objectives

The specific RFI objectives for this site are as follows:

1. Assure that the site is safe for field operations by conducting UXO site clearance procedures prior to initiating any investigative activities.
2. Conduct a visual evaluation of the site by the UXO specialists to clarify the probable nature of past site activities and to assess the extents of “kick out” debris that were generated from the demolition events.
3. Conduct a geophysical survey in the vicinity of the two detonation pits to detect any subsurface metal anomalies that could indicate the presence of buried metallic drums or ordnance.
4. Determine if, and to what extent, contaminant constituents have leached from the waste materials and metal drums located at the surface. If contamination is detected, characterize the nature of that contamination and the potential for further releases, and assess the risk posed by this contamination to potential receptors in the vicinity of the site.
5. Record and map the precise location of all survey points delineating the site and all sampling points established during this investigation.
6. Construct two permanent bench mark monuments tied to the New Mexico State Plane Coordinate System and referenced to the current North American Datum (NAD) so that the site and all recorded survey points may be readily located in the future.

#### 4.3.4. Data Collection Plan

Soil sampling activities at this site are divided into three areas of interest: the major detonation pit, the minor detonation pit, and the general site area outside of the two specific detonation zones. In addition to surface and subsurface soil samples submitted to the laboratory for chemical analysis, surface soil samples would be field tested for explosives as part of the UXO site safety clearance procedures.

Table 4-3-1, which follows this subsection, summarizes the planned data collection effort for this site as envisioned in the RFI Workplan. Per the Workplan, two soil borings were planned for SWMU 20, one boring per detonation pit. Ten surface soil sampling points would be distributed in a manner which would provide reasonably representative areal distribution of sampling activity within the immediate vicinity of the two pits. In addition, should the examination of the drums determine that any of the drums contain materials that might be contaminated, or might be contaminant materials, then samples would be taken of the contents and submitted for laboratory analysis of contaminant parameters suggested by the nature of the materials.

Sample Type	Number of Samples	TPH	Metals	PCBs	Metals	Explosives	Dioxins/ Furans	Inorganics
Soil: Surface	10	X	X	X	X	X	X	X
Borings <sup>1</sup>	8	X	X	X	X	X	X	X
Rinsate	1	X	X	X	X	X	X	X
Split	2	X	X	X	X	X	X	X
<sup>1</sup> 2 borings to 10' depth, 4 Samples ea. at variable depths								
<sup>2</sup> Inorganic parameters: Nitrate-nitrite, ignitibility, free liquids and pH								

Table 4-3-1 – SWMU 20 Proposed Number of Sample Parameters

#### 4.3.5. Investigation & Sampling Summary

The field investigation of SWMU 20 consisted of the following activities: UXO site clearance and site survey, layout of the coordinate grid as a basis for conducting the

geophysical survey and subsequent sampling procedures, the geophysical survey to detect buried metallic drums or ordnance, surface sampling to collect soil samples for chemical laboratory analysis, and soil boring to recover chemical and geotechnical samples for laboratory analysis and to log the geologic strata beneath the surface of the site.

#### 4.3.5.1. UXO Site Clearance

Four surface soil samples were field tested for explosives as a part of the UXO site safety clearance activity. This procedure is briefly discussed in Section 3.1 of this Report and in Appendix 2 of the Workplan for this RFI. Three of the samples were collected in, or from the immediate vicinity of, the major detonation pit while the fourth sample was collected from the minor detonation pit. The results of these field tests are presented in Section 4.3.6. These sampling points are designated SS20-CMS-1 through SS20-CMS-4 and may be located on the Site Sampling Location map (Figures 4-3-5 A and B) included later in Section 4.3.6.

#### 4.3.5.2. Coordinate Site Grid

Two grids were constructed at SWMU 20, one grid per detonation pit area. The x-y coordinate grids located at both detonation pits were established with the y-axis oriented to the north, x-axis positive to the east, with the origin anchored at the southwest corner of the grid (refer to the Site Grid and Geophysical Survey map, Figure 4-3-4, included on the following page). Grid nodes were located every 50 feet in both the x and y directions. These grids provided site control for the geophysical survey and all subsequent site activities.

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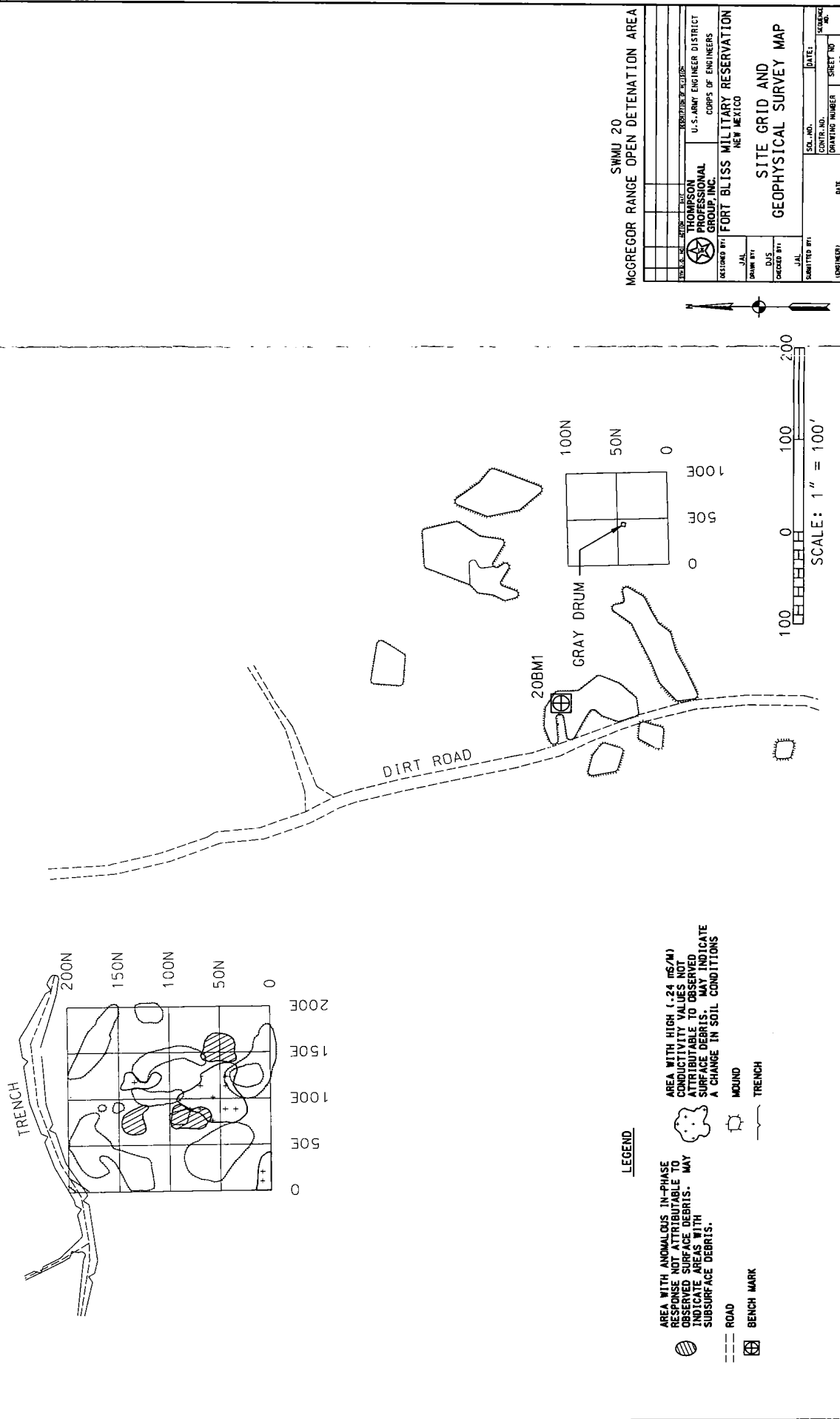


Figure 4-3-4  
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#### 4.3.5.3. Geophysical Survey

The geophysical survey was performed using EM-31 frequency electromagnetic as described in Section 3 of this Report. Magnetometry was not used at this site due to the high concentration of surface metallic debris which would interfere with the subsurface signal. The GPR technique was not used for safety reasons on the advice of the UXO specialists who remained on-site for the entirety of the investigation at SWMU 20. The GPR-generated signal could cause explosive electronic devices to detonate if any such devices were present at the site and were capable of detonation.

A complete discussion of the geophysical investigation of SWMU 20 is included as Section 5.2 in the Final Report from Golder Associates included as Appendix 2 in this RFI Report. The geophysical team deployed the EM-31 across the grid area at each detonation zone. When the results of this method had been evaluated, a site map, referenced to the control grid, delineating areas of metallic debris and other pertinent site features, was prepared to provide a basis for locating subsequent investigative activities (see Site Grid and Geophysical Survey map). The EM-31 did not detect any large subsurface metallic objects such as metal drums.

#### 4.3.5.4. Soil Boring and Surface Sampling

Following a review of the results of the geophysical investigation and consultations with the UXO specialists, who were experienced in demolition procedures and were able to interpret the history of certain features of the detonation area, the optimum locations for the 2 soil borings and 10 surface samples were selected. The UXO specialists identified what they believed was the detonation pit at each detonation area. The soil borings were then located at the low point of these two pits so that the soil samples taken would have a high probability of detecting any contaminants that may have been suspended in

runoff and concentrated by ponding at these two points. It should be noted that the geophysical grid constructed at the minor detonation area was situated on the basis of a high concentration of surface debris at that locale. The UXO specialists advised that, in their opinion, this was not the location where the detonations occurred, but was rather an area that contained a high concentration of "kickout" resulting from the detonations. The UXO specialists then directed Thompson personnel to what the specialists believed was the site of the detonations.

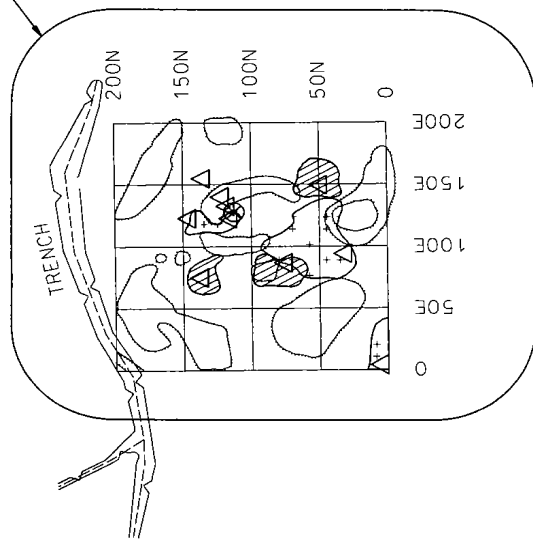
Six surface soil samples were collected from a 100-foot by 100-foot area immediately surrounding the soil boring at the major detonation pit in order to detect any evidence of "kickout." Two more surface samples were collected from the major detonation area at greater distances from the pit. Two surface soil samples were collected from the minor detonation area, one within 100 feet of the soil boring and the other somewhat further away in a zone of concentrated surface debris.

The methodology used for soil boring and surface soil sampling is included in Section 3 of this Report. The locations of the borings and surface soil samples may be referenced on the Site Sampling Location Map for SWMU 20 (Figures 4-3-5 A and B) which is included on the following pages. Table 4-3-2, which follows, presents a summary of the sampling effort expended at this site.

Sample Type	Number of Samples	TPH	Metals	PCBs	Metals	Explosives	Dioxins/ Furans	Inorganics <sup>2</sup>
Soil: Surface	10	X	X	X	X	X	X	X
Borings <sup>1</sup>	4	X	X	X	X	X	X	X
Rinsate	1	X	X	X	X	X	X	X
Split	2	X	X	X	X	X	X	X
<sup>1</sup> 2 borings to 10' depth, 2 Samples ea. at variable depths								
<sup>2</sup> Inorganic parameters: Nitrate-nitrite, ignitibility, free liquids and pH								

Table 4-3-2 – SWMU 20 Actual Number of Sample and Parameters

SEE MAJOR PIT AREA SHEET



SS20-8Δ

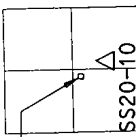
DIRT ROAD

SS20-CMS-4 SB20-2

20BM1

SS20-9Δ

GRAY DRUM



LEGEND

- AREA WITH ANOMALOUS IN-PHASE RESPONSE NOT ATTRIBUTABLE TO OBSERVED SURFACE DEBRIS. MAY INDICATE AREAS WITH SUBSURFACE DEBRIS.
- ROAD
- SOIL BORINGS
- SURFACE SOIL SAMPLE
- AREA WITH HIGH (>24 μS/CM) CONDUCTIVITY VALUES NOT ATTRIBUTABLE TO OBSERVED SURFACE DEBRIS. MAY INDICATE A CHANGE IN SOIL CONDITIONS
- MOUND
- TRENCH
- BENCH MARK

SWMU 20		MCGREGOR RANGE OPEN DETENTION AREA	
THOMPSON PROFESSIONAL GROUP, INC.	U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS	FORT BLISS MILITARY RESERVATION NEW MEXICO	
DESIGNED BY: JAL	DRAWN BY: DJS	CHECKED BY: JAL	SUBMITTED BY: JAL
DATE: 11/06/2018		DATE: 11/06/2018	
CONTRACT NO. 14-2903		SHEET NO. 51	
PROJECT NUMBER		REVISIONS	
ENGINEER		DATE	

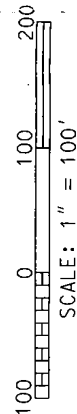
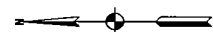


FIGURE 4-3-5 A  
SECTION 4 - PAGE 51

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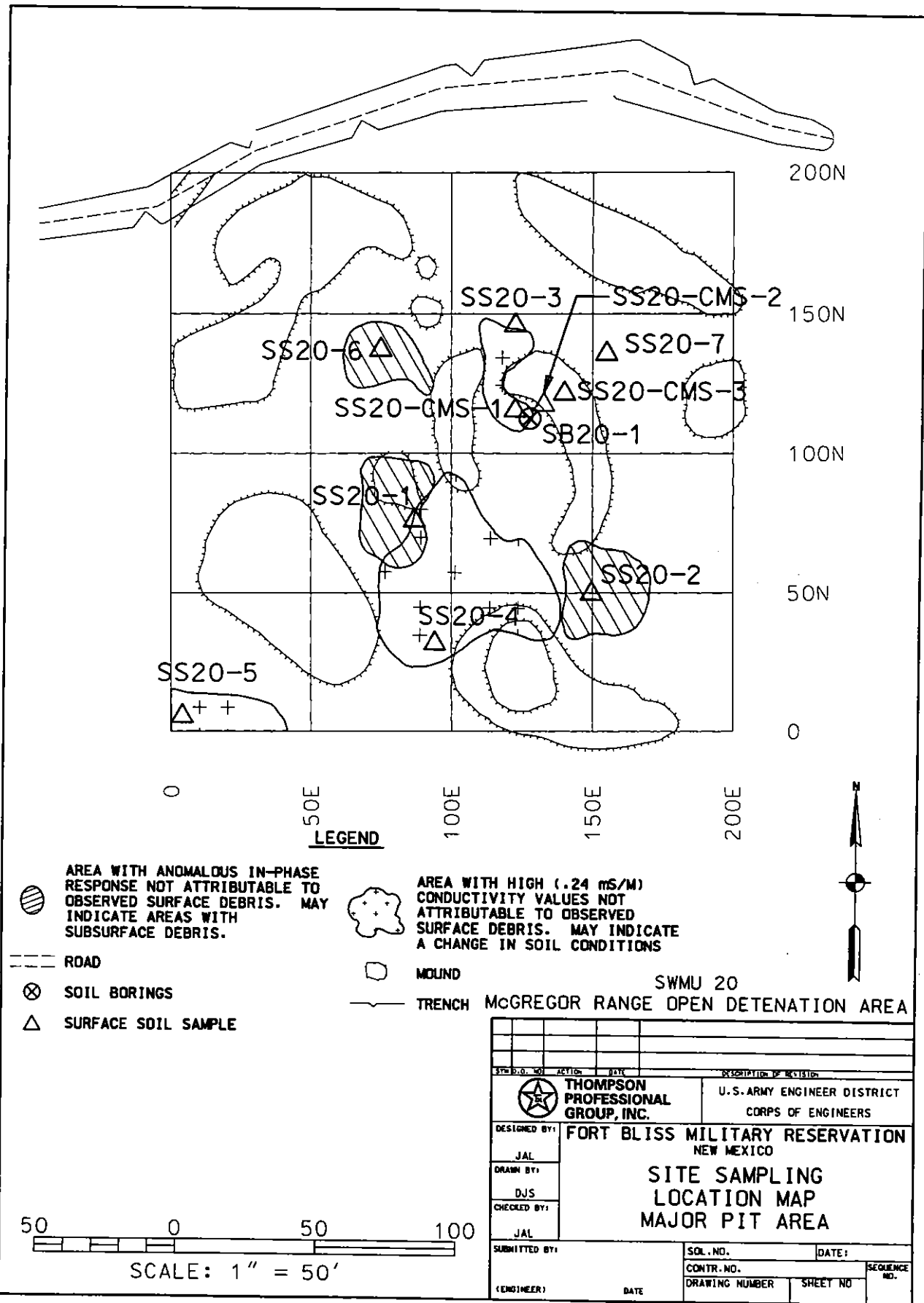


FIGURE 4-3-5 B  
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#### 4.3.6. Results of Investigation-Findings

##### 4.3.6.1. Unit Characterization

Based on the results of the geophysical survey and a thorough exploration of the site by the UXO specialists from CMS Environmental and personnel from Thompson, the site appears as was originally described in the Workplan for this RFI and reiterated in the unit description contained in Subsection 4.3.1. The efforts expended during the field investigation did serve to establish the locations of the two detonation pits with a relatively high degree of probability. In addition, the metal drums located at the surface in the vicinity of the major detonation pit were examined in detail and found to be without contents. One surface sample, SS20-7, was collected very near to one of the drums to detect any contaminants that may have originated from this drum. The unusual gray drum, which was originally identified in the RFI Workplan, located in the vicinity of the minor detonation pit was carefully examined and was determined to be a fuselage component of one of the Nike series missiles.

##### 4.3.6.2. Waste Characterization

The waste materials identified at this site during the field investigation were consistent with those mentioned previously in the RFI Workplan. The site is littered to varying degrees of concentration with the debris from exploded Nike and Ajax missiles. The heaviest concentrations of debris are in the immediate vicinity of the detonation pits. Waste items present at the site, in addition to fiberglass and metal missile components, include abandoned metal drums (major detonation area) and rolls of barbed wire (minor detonation area). All of the drums that were examined were found to be empty.

The geophysical survey identified three small areas in the immediate vicinity of the major detonation pit that might contain buried debris. The probable depths

of this debris could not be established with the geophysical methods employed. It is possible that debris from detonation events could have been covered with thin layers of soil “kicked out” from subsequent explosions; thereby, obscuring the debris from surface observation.

#### 4.3.6.3. Sampling Results

The results of the chemical laboratory analyses of soil samples collected from SWMU 20 are contained in Appendix 11 of this RFI Report. Table 4-3-3, analytical results, presents a listing of samples where a chemical constituent was detected by the laboratory at a level exceeding the estimated background concentration for that particular compound. The data evaluation and validation methodology is discussed in detail in Subsection 4.1.

The results of soil sample submitted for geotechnical laboratory analyses are presented in Table 4-3-4. The complete geotechnical laboratory report is included as Appendix 5 to this Report.

None of the constituent concentrations of metals detected are of an order of magnitude greater than the related background concentrations. For the tabulated metals, the exceedances of background concentration may be explained by geochemical variation in the sampling location versus the background location. Background information was not provided on copper, strontium and zinc. Since these metals were detected in the samples, a literature search was performed to derive background levels for these parameters, and the resulting background levels used for screening these metals are as follows: copper-20 mg/kg; strontium-300 mg/kg; and zinc-50 mg/kg.<sup>40</sup> Iron and potassium were detected

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<sup>40</sup> Allaway, W.H. “Agronomic controls over the environmental cycling of trace elements.” Adv. Agron. 20: 235-274, 1968.

in all of the samples, and the ranges of the concentrations detected are listed in Table 4-3-3.

Polychlorinated Biphenyl (PCB) contamination appears to have been detected in sample SS20-6 (0.81 mg/kg), which was a surface sample collected at this site. The specific PCB found is Arochlor-1254. Arochlor-1254 contamination was detected in sample SS20-1-01 at a concentration of 0.091mg/kg. It is a matter of qualitative judgment whether the other organic detections presented in Table 4-3-3 represent significant levels of contamination.

Total Heptachlorinated dibenzo-*p*-dioxin (HpCDD) was detected at 10.9 parts per trillion (ppt). Background samples for dioxin analysis are not available, and a literature search did not reveal any information on a risk-based concentration for HpCDD. No other dioxins were detected above the limit of quantitation.

Nitrate-Nitrite analysis was also included in the chemical analyses of samples collected at this site. The analysis for nitrate-nitrite reveals that the levels of this parameter varied from not-detected (<1) through 6.11 mg/kg. The calculated background concentration (see Appendix 9, SB 19-11) of nitrate-nitrite for SWMU 20 is 1.1 mg/Kg.

None of the detected sample constituent concentrations that exceeded background levels equaled or exceeded the related Risk-Based Concentrations.

All samples from SWMU 20 were also tested for hazardous characteristics as defined by RCRA. These parameters were corrosivity and ignitability. Corrosivity is measured by pH. A material is considered corrosive if it exhibits a pH less than or equal to 2, or greater than or equal to 12.5. Samples collected at this site exhibited pH readings of between 7.14 and 8.85 standard units, and are not defined as being corrosive. A material is defined as being ignitable if it exhibits a flashpoint less than 60°C (140°F). All samples collected at this site

exhibited flashpoints greater than 200°F, and are not defined as being ignitable. Additionally, a free liquids test (paint filter test) was performed on all samples, and all samples were determined to not contain free liquids.

The data validation process of the chemical analysis determined that most of the data collected from this sight is reliable and representative of the conditions at the time of the investigation at SWMU 20. However, there are three parameters with results that may be questionable: RDX, Picric Acid, and HMX. These three explosives had low LCS/LCSD and MS/MSD recoveries. Even though these compounds were not detected in laboratory samples, the low standard recoveries suggest that the compounds could be present in the soils of this site in low concentrations. This is significant based on the field test for TNT/RDX discussed below. Other results of the data validation process show two deviations from the work plan. PCBs were to originally be analyzed by SW-846 Method 8081, but were actually analyzed as Method 8080. Method 8080 was chosen to provide a level of consistency with the analysis of the background samples which were also analyzed by Method 8080. Finally, Dioxin/Furan analysis was to be performed by SW-846 Method 8280, but were analyzed by Method DFLM1.1. DFLM1.1 and 8280 are comparable methods and similar results would be expected from either of these methods.

Sample Number	Depth Interval (ft.)	Parameter	CAS Number	Results (mg/Kg)	Estimated Background Concentration (mg/Kg)	Percent Exceedence of Background	Risk-Based Concentration <sup>1</sup> (mg/Kg)	Exceeds Risk-Based Concentration?
20-2-01	0-5	Nitrate-Nitrite	NA	1.25	1.1	114	See Below*	No
20-2-02	5-10	Nitrate-Nitrite	NA	4.68	1.1	425	See Below*	No
SS20-1-01	0-2	Arochlor-1254	11097-69-1	0.091	0.0902	101	1.6	No
SS20-1-01	0-2	HPCDD		0.000109	NS	NA	Not Determined	NA
SS20-1-01	0-2	Nitrate-Nitrite	NA	1.14	1.1	103	See Below*	No
SS20-3-01	0-2	Nitrate-Nitrite	NA	6.11	1.1	555	See Below*	No
SS20-3-03	0-2	Nitrate-Nitrite	NA	5.26	1.1	478	See Below*	No
SS20-3-03	0-2	Chromium	7740-04-73	25.9	23.6	110	390	No
SS20-4	0-1.5	Antimony	7740-03-60	2.7	NS	NA	31	No
SS20-6	0-1.5	Cadmium	7440-43-9	1.8	1.7	106	39	No
SS20-6	0-1.5	Arochlor-1254	11097-69-1	0.810	0.0902	898	1.6	No
SS20-7	0-1.5	Lead	7439-92-1	29.1	16.2	180	400 <sup>2</sup>	No
SS20-8	0-1.5	Antimony	7740-03-60	4.1	NS	NA	31	No
SS20-85	Rinsate	Mercury	7439-97-6	0.1	Rinsate	NA	NA	No
SS20-85	Rinsate	Strontium	7440-24-6	2	Rinsate	NA	NA	No
All Samples	0-10	Potassium	7440-09-7	780 - 1420	NS	NA	None	No
All Samples	0-10	Iron	7439-89-6	3550 - 7470	NS	NA	23,000	No

<sup>1</sup>Values are from EPA Region 3 Risk-Based Concentrations for Soil Ingestion - Residential, unless otherwise noted (see Appendix 10).

<sup>2</sup>Derived from the U.S. EPA Region IX Preliminary Remediation Goals, Second Half 1995, September 1, 1995 (see Appendix 10).

\*The Risk-Based Concentrations from EPA Region 3 is 130,000 mg/Kg for Nitrate is, and 7,800 mg/Kg for Nitrite.

NS-Not Sampled, NA-Not Applicable.

Table 4-3-3 - SWMU 20 Analytical Results

Sample ID	Depth Interval (ft.)	Moisture Content (%)	Dry Unit Weight (lbs/ft <sup>3</sup> )	Permeability (cm/s)	Organic Content (%)	pH Soil/Solid	CEC (meq/100g)
SB20-GT1	0 - 2	13	982	8.23E-06	0.27	9.4	4.76

Table 4-3-4 - SWMU 20 Geotechnical Results

The results of the UXO field safety clearance tests are shown in the following table. For these samples, the D Tech Field Test Kit was configured for both RDX and TNT.

Sample ID	Concentration	Remarks
SS20-CMS-1	< 0.5 PPM	(undetected)
SS20-CMS-2	< 0.5 PPM	(undetected)
SS20-CMS-3	3 PPM	
SS20-CMS-4	5% by weight	(refer to text)

Table 4-3-5 - SWMU 20 UXO Clearance Results

UXO surface soil clearance sample SS20-CMS-4 was recorded in the UXO field notes (see Appendix 7) as testing at a concentration of 5% for explosives. The normal configuration of the field test kit measures from 0.5 to 5 ppm, or mg/Kg. Concentrations greater than 5 ppm must be measured by diluting the sample extract. While the result for the field testing of sample SS20-CMS-4 may have been recorded properly as 5%, it is also possible that it could have been recorded in error as 5% rather than 5 ppm. However, in the absence of any evidence that a recording error has been committed, the sample results should be evaluated as recorded.

Two surface samples were collected in the immediate vicinity of SS20-CMS-4: SS20-9 and 20-2-1. Analysis of these two samples did not produce a detection for explosives. It is possible that the explosives detected in sample SS20-CMS-4 could be related to localized, residual explosive material, and explosives contamination is not generalized in this area of the site.

The EPA Region 3 does not publish RBCs for RDX or TNT. The EPA Region 9 does list its Preliminary Remediation Goals (PRGs) for RDX and TNT as 400 and 1500 mg/kg, respectively (see Appendix 10). Since a 5% concentration is equivalent to 50,000 mg/kg, the explosives concentration measured in sample SS20-CMS-4, if tested and recorded accurately, is greater than 10 times the screening levels proposed by EPA Region 9.

#### 4.3.7. Contaminant Characteristics

The only analyte found to be significantly above the background concentration was Arochlor-1254 in sample SS20-6 (surface sample), at a concentration of 0.81 mg/Kg, but below the EPA Region III risk-based concentration of 1.6 mg/kg. Arochlor-1254 is a polychlorinated biphenyl (PCB) also known as PCB-1254 or chlorodiphenyl (54% chlorine), and is assigned the CAS Number 11097-69-1. Common uses included electrical transformers, capacitors, hydraulic fluid plasticizers, adhesives, and pesticide extenders. Production and sales of PCBs were discontinued in 1977; however, PCBs are still present in older electrical equipment.

The physical properties are as follows: pale yellow, viscous liquid, practically odorless, density 1.495-1.505 (15.5°C), boiling point 365-390°C, slightly soluble in water.

Arochlor-1254 released into the soil is generally persistent, hydrophobic, and generally does not migrate. Arochlor-1254 is generally resistant to biodegradation. Arochlor-1254 tightly adsorbs to soil, and should not leach significantly under normal conditions. However, in the presence of organic solvents, the potential of leaching increases.

Additionally, the volatilization rate of Arochlor-1254 from soils may be low due to the tight adsorption.<sup>41</sup>

Based on the data available at this stage of the RFI, it is not possible to characterize the level or extent of Arochlor-1254 contamination at this site.

#### 4.3.8. Potential Receptor Identification

SWMU 20 is located in a remote area on a vast military installation in an arid desert. This site is part of the McGregor Range Camp, and only the range camp cantonment is populated. Human access to the site and adjacent lands is restricted to military personnel working or residing at the McGregor Range Camp, other military personnel in the area during training exercises, civilians and military personnel engaged in hunting activities, and civilian contractors working on projects for the military. Since the SWMU is located on a military installation, it is assumed that public access is generally restricted; however, there are no physical barriers to prevent unauthorized personnel from entering this area, and Range Camp personnel report that such unauthorized entry is not uncommon.

Previous well tests at McGregor indicated that the groundwater at this site did not have an adequate yield or quality for use as potable water for the facility.<sup>42</sup> There are no surface water bodies in the vicinity of the site except for SWMU 19 which is a wastewater oxidation pond serving the McGregor Range Camp.

The scope and depth of information needed on the population of potential receptors and the relative risk to those receptors are directly related to whether contamination is confirmed, and at what concentration level it is confirmed, and the potential for

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<sup>41</sup> Spectrum Laboratories: Chemical Fact Sheet - CAS #11097-69-1.

<sup>42</sup> Rapp, John R., Summary of Test Drilling and Ground-Water Conditions in the McGregor Range Area, Otero and Dona Ana Counties, New Mexico and El Paso County, Texas, USGS, October 1957.

exposure based on a developed model for the migration of such contamination. According to the Workplan for this RFI, if it is determined that contaminants exist at this site at levels that exceed EPA Region 3 Risk-Based Concentrations (RBCs) at a statistically significant level of confidence, then a baseline qualitative Human Health Risk Assessment (HHRA) will be performed at this site. This HHRA would be performed utilizing guidance as provided by the EPA documents *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)*<sup>43</sup> and *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual Supplemental Guidance*.<sup>44</sup> None of the samples collected from SWMU 20 exhibited levels of contamination equal to, or greater than, the relevant RBCs. Therefore, no HHRA has been, or is scheduled to be, performed at this time.

Another aspect of risk assessment is an ecological risk assessment, which in many ways is more complex than an HHRA. This is due, in large part, to the need to evaluate multiple species, the level of ecological structure to be considered (species, populations, ecosystems, etc.), and the less well-established bench marks for chronic toxicity, etc. The process for conducting a screening-level ecological risk assessment (SERA) was discussed in the Workplan for this RFI and will not be repeated here.<sup>45</sup> No visible signs of stressed vegetation were apparent at the site. By the nature of the activities that have taken place at this site, the surface areas where the detonations occurred have been impacted, and the area is littered with missile components and several abandoned waste drums.

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<sup>43</sup> USEPA Office of Solid Waste and Emergency Response, Toxics Integration Branch, Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A), EPA/540/1-89/002, Washington, DC, 1989.

<sup>44</sup> USEPA Risk Assessment Forum (February), Framework for Ecological Risk Assessment, EPA/630/R-92/001 Washington, DC, 1992.

<sup>45</sup> Ibid., USEPA Risk Assessment Forum (February).

At this stage in the RFI process, based on a qualitative review of the types, concentrations and locations of contaminants detected at this site, the additional expense that would be experienced by conducting an extensive risk assessment is not warranted.



#### 4.4. SWMU 25-Orogrande Range Rubble Pit/Landfill

Solid Waste Management Unit (SWMU) 25 is known as the Orogrande Rubble Pit/Landfill. This site has also been identified as Landfill No. 14 (FTBL-014). The landfill is located about 0.8 miles south of the Orogrande Range Camp, immediately west of Elephant Mountain. The Orogrande Range Camp lies within the Fort Bliss Military Reservation which covers approximately 1.2 million acres of land in New Mexico and Texas near El Paso, Texas.<sup>46</sup> The site is located in the New Mexico portion of the Fort Bliss Military Reservation within the Tularosa Basin of the New Mexico Highland section of the Basin and Range province approximately 45 miles north of El Paso.<sup>47</sup> An Aerial Photograph (Figure 4-4-1) of the site is located on the following page.

The Site Location Map (Figure 4-4-2) shows the Orogrande Range area, the location of SWMU 25 and the other SWMUs in this area, and is located following the Aerial Site View.

##### 4.4.1. Unit Description and Characteristics

SWMU 25 is a two-acre, trench-type landfill, underlain and covered with soil. SWMU 25 is currently inactive, but was operated and is owned by Fort Bliss. The specific topography of the site is depicted on the SWMU 25 Site Plan (Figure 4-4-3) located on the following pages. The number of trenches constructed, the nature of the waste received, and the period of operation cannot be firmly established from the available sources of historical information on this site. The RFA Report by A.T. Kearney, Inc. states that the site contains two waste pits: one pit which was opened in 1983 and still active in 1989, the period of the RFA; and a second, inactive pit situated immediately east of the active pit. The RFA describes the active pit as measuring 300 feet long by 50 feet wide and 35 feet deep and as having received various waste materials from the

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<sup>46</sup> A.T. Kearney, Inc., RCRA Facility Assessment PR/VSI Report: U.S. Army Air Defense Artillery Center and Fort Bliss, Texas, Prepared for the U.S. Environmental Protection Agency, Chicago, IL, March 1989.

<sup>47</sup> Section 2, Environmental Setting for a general overview of the geology and hydrogeology in this area.

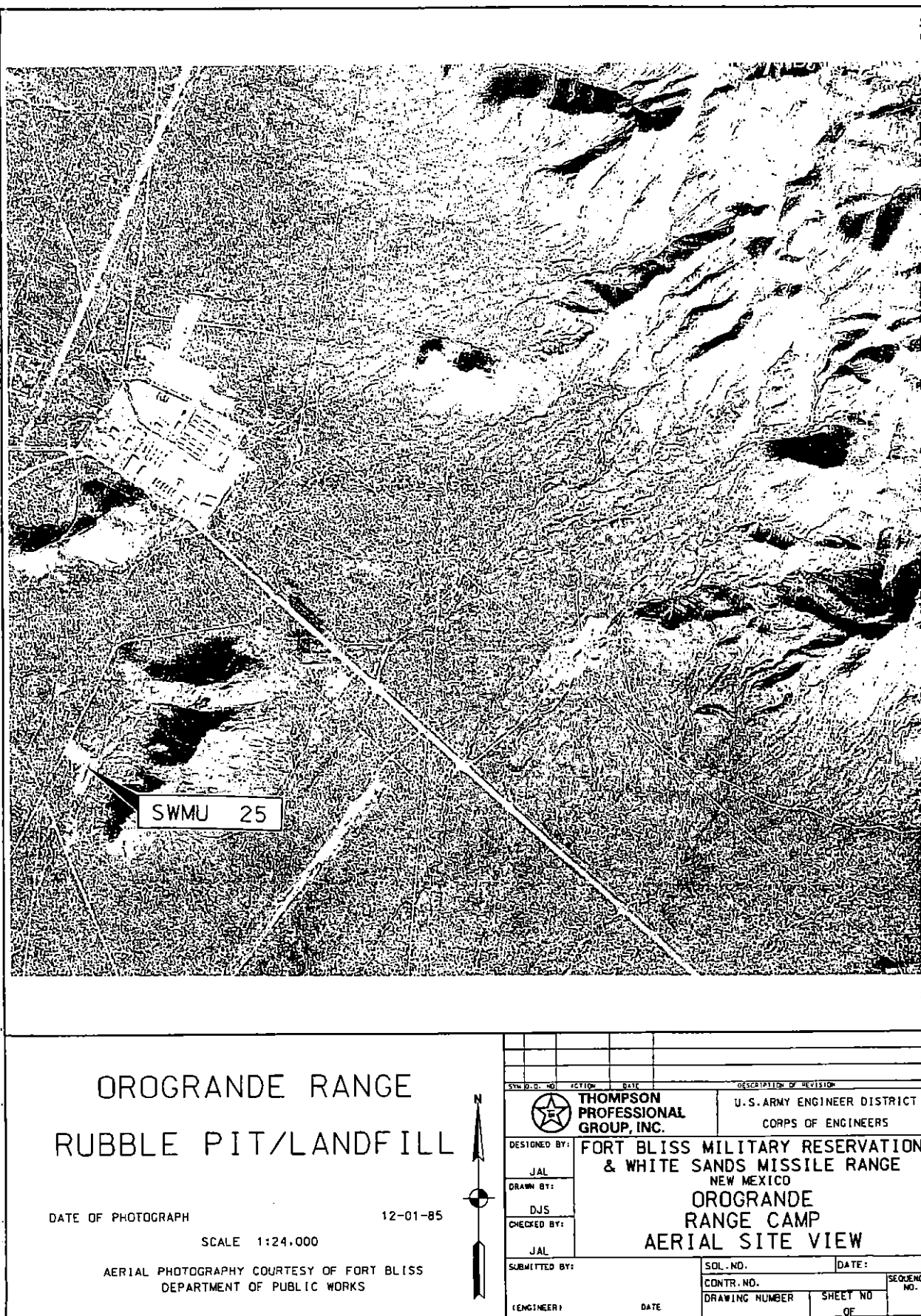
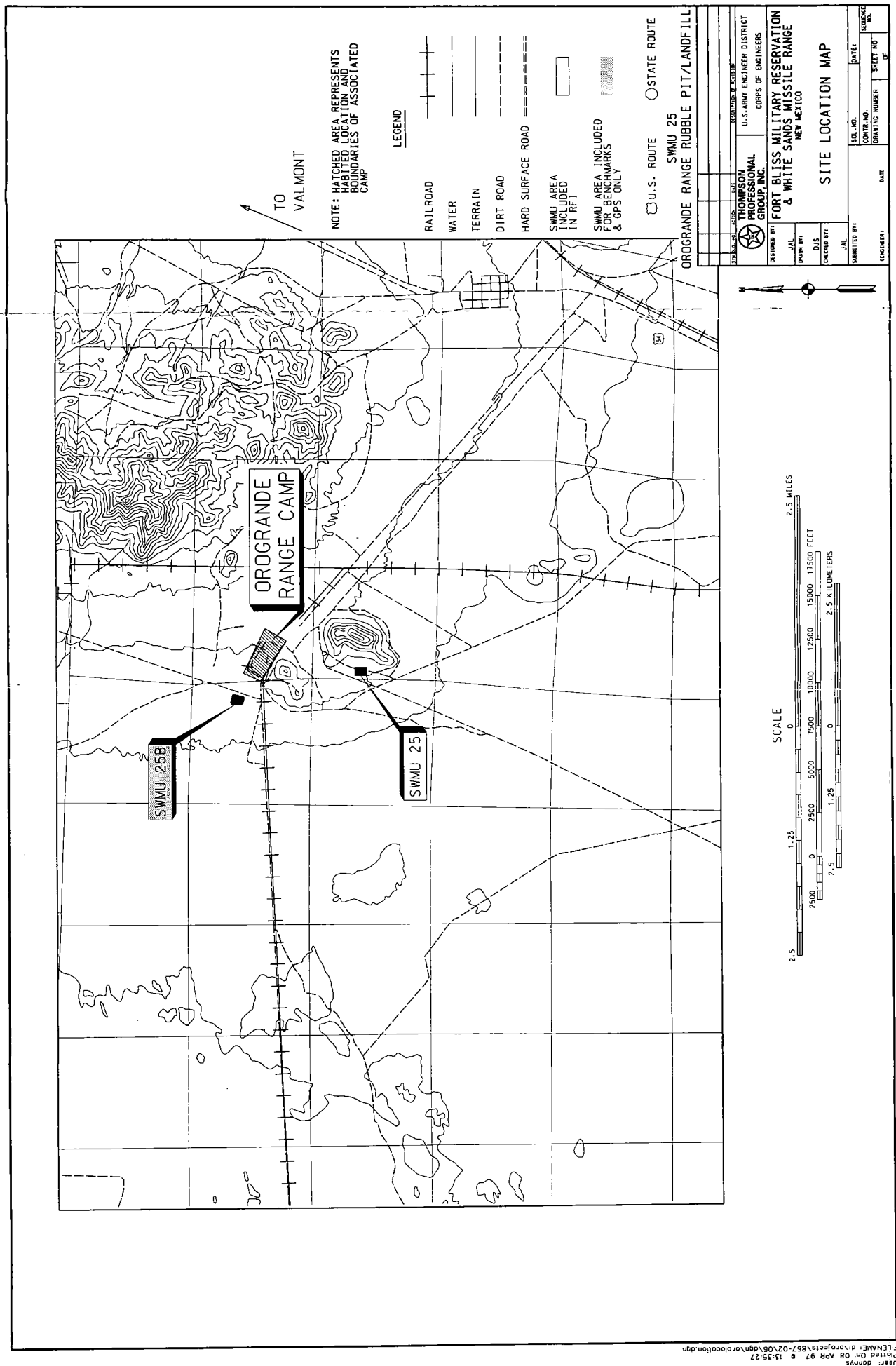
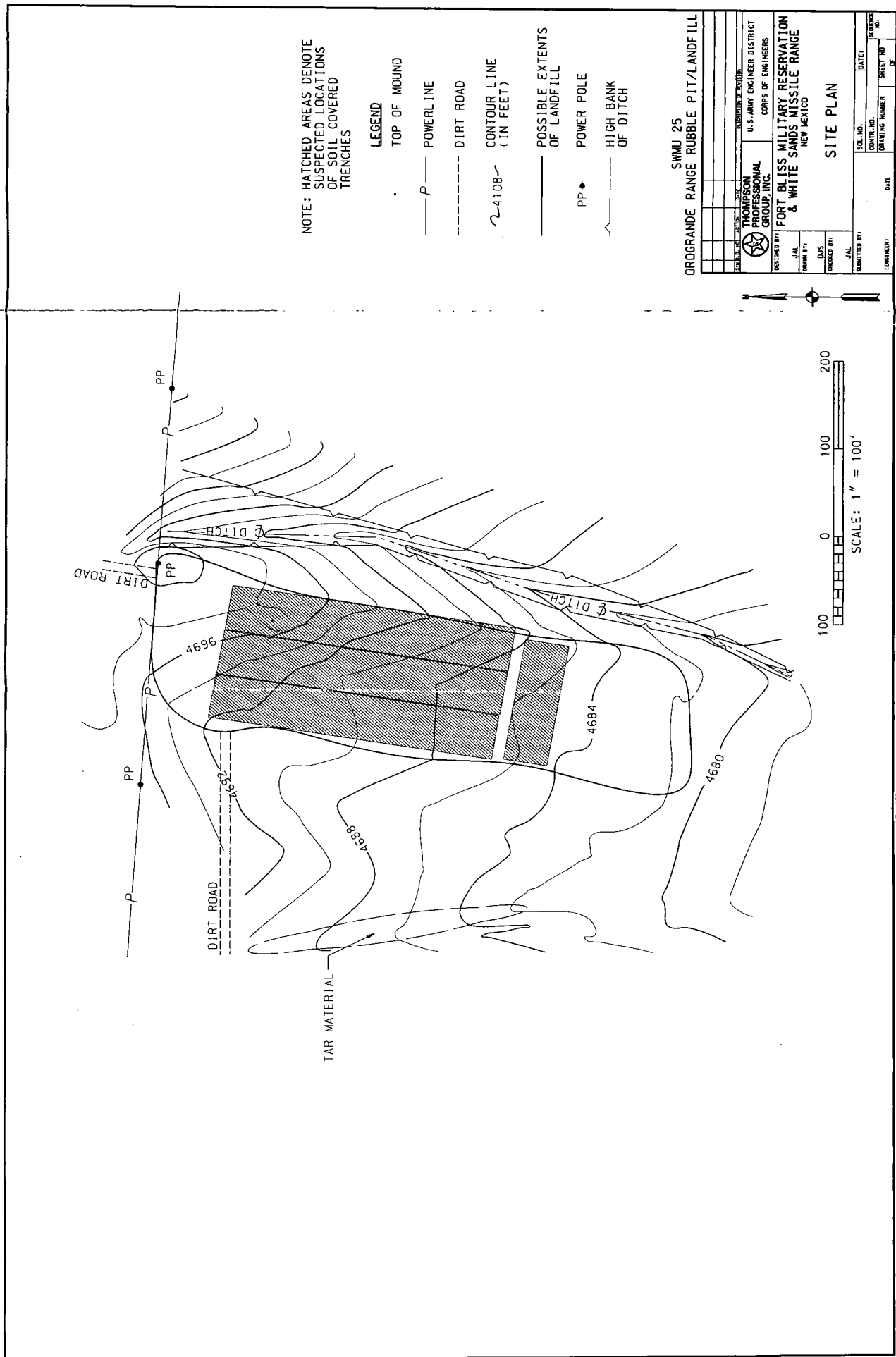


Figure 4-4-1  
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Orogrande Range Camp (including wood, plastic, cardboard, paper, and some metal; no food items). No information is provided in the RFA on the dates of operation, nature of waste received, or dimensions of the inactive pit. The RFI Workplan contract document contains a discussion of SWMU 25 which indicates that the trench reported as active in the RFA was closed and covered with natural soil in 1994. This document dates the period of operation of landfill to 1983, which can be inferred to mean that the older trench began operations in 1983, in contradiction to the RFA which dates the period of operation of the newer trench to 1983. Therefore, it is unclear whether landfill operations began prior to 1983 or if the newer pit began operations some time later than 1983. This document also expands the source of waste materials buried at the site to include White Sands Missile Range contractors. Further information on SWMU 25 was obtained during a site visit interview conducted by Thompson staff in October 1995. The individual interviewed was familiar with the site, and he indicated that there may be as many as four inactive trenches at this landfill. A third trench, similar in dimensions to the most recently closed trench, was believed to be located east of the previously mentioned trenches and parallel to them. A fourth trench, much shorter than the other three, was reported to be located immediately south of, and perpendicular to, the other trenches. All sources of information agree that the trenches were unlined, covered with natural soil, and graded to natural ground level when closed.

This site is set in a desert climate with desert scrub and grass vegetation. There are no nearby surface water bodies or rivers, and any streams are intermittent in nature, flowing only during significant rainfall events. In this area the groundwater is reported to be approximately 300 feet from the ground surface, although there may be perched groundwater at lesser depths.<sup>48</sup>

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<sup>48</sup> Section 2, Environmental Setting for a General Overview of the Geology and Hydrogeology in this area.

#### 4.4.2. Interim Measures

There have been no known documented interim corrective measures taken in the past at SWMU 25 for mitigation of contamination. Furthermore, no indicators of contamination, such as stressed vegetation or discolored soils, were detected during the course of the field operations conducted at this site; therefore, no interim measures were implemented following the site investigation.

#### 4.4.3. Site Specific RFI Objectives

The specific RFI objectives for this site are as follows:

1. Determine the number, areal extents, and depths of the waste units present at SWMU 25.
2. Evaluate the thickness and other characteristics of the soil covers in terms of the capping requirements of the New Mexico Solid Waste Management Regulations, EIB/SWMR-4.<sup>49</sup>
3. Assess the susceptibility of the surface soils at the site to erosion.
4. Determine if, and to what extent, a contaminant release from the waste units to the environment has occurred. If such a release has occurred, characterize the nature of that contamination and the potential for further releases, and assess the risk posed by this contamination to potential receptors in the vicinity of the site.
5. Investigate the area west of the site where a deposit of tar material was identified in the RFI Workplan.
6. Record and map the precise location of all survey points delineating the site and all sampling points established during this investigation.

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<sup>49</sup> New Mexico Environment Department, Solid Waste Bureau, New Mexico Solid Waste Management Regulations, EIB/SWMR-4, July 18, 1994.

7. Construct two permanent bench mark monuments tied to the New Mexico State Plane Coordinate System and referenced to the current North American Datum (NAD) so that the site and all recorded survey points may be readily located in the future.

#### 4.4.4. Data Collection Plan

Four distinct but interrelated tasks comprise the data generation effort at this site: geophysical survey, soil gas sampling, trench excavation, and soil boring. The results of the geophysical survey using GPR, EM, and magnetometry methods were to be used to establish the number, boundaries, and depths of the waste trenches and to provide a basis for locating the soil gas sampling points. Data generated from the soil gas sampling program, in combination with the results from the geophysical studies, were then to provide a basis for optimizing the location of the trench excavation and the siting of soil borings. The selection of the optimal location for the excavation of the waste trench and visual inspection of the waste mass were to be based on obtaining the most representative sampling of the buried materials and on inspecting any waste items of particular interest, such as waste drums. Technical details on the procedures to be used in completing each of these four tasks are located in Section 3.

Table 4-4-1, which follows this subsection, summarizes the planned data collection effort for this site as envisioned in the RFI Workplan. Per the Workplan, a minimum of two soil gas sampling points were to be allocated to each waste trench identified by the geophysical survey. Based on the prior information concerning the number of waste trenches that might be present at this site, a total of 10 sampling points were allocated among the trenches. A total of five soil borings were planned for SWMU 25 with one of the borings to be drilled at an angle such that the boring terminated beneath a waste trench. As with the soil gas sampling points, the locations of these borings were to be determined based on the results of the geophysical survey. In addition, the results of the soil gas survey would be reviewed to optimize placement of the borings. Four surface soil samples were to be taken at two separate locations to assess potential

soil contamination in the vicinity of the tar mound.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	TPH	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O <sub>2</sub> )	Hydrogen Sulfide <sup>1</sup>
Soil: Surface	4		X		X	X				
Borings <sup>2</sup>	35	X	X	X	X					
Rinsate	2	X	X	X	X					
Split	4	X	X	X	X					
Soil Gas	10	X <sup>1</sup>					X	X	X	X

<sup>1</sup> Field tested

<sup>2</sup> 5 borings to 50' depth, Samples at 0', 5', 10', 20', 30', 40', and 50'

Table 4-4-1 – SWMU 25 Proposed Number of Samples and Parameters

#### 4.4.5. Investigation & Sampling Summary

The field investigation of SWMU 25 consisted of the following activities: layout of the coordinate grid as a basis for conducting the geophysical survey and subsequent sampling procedures; the geophysical survey to locate and determine the extents of the waste units; the soil gas survey to detect zones of possible VOC contamination; the trench excavation to characterize the buried wastes; surface soil sampling at the deposit of tar material; and, soil boring to recover chemical and geotechnical samples for laboratory analysis and to log the geologic strata beneath the surface of the site.

##### 4.4.5.1. Coordinate Site Grid

The x-y coordinate grid was established with the y-axis oriented approximately 20 degrees to the east of north with the origin located at a point in the southwest corner of the site (refer to the Site Grid and Geophysical Survey Map, Figure 4-4-4, which follows this page). This grid provided site control for the geophysical survey and all subsequent site activities. Based on the size of the

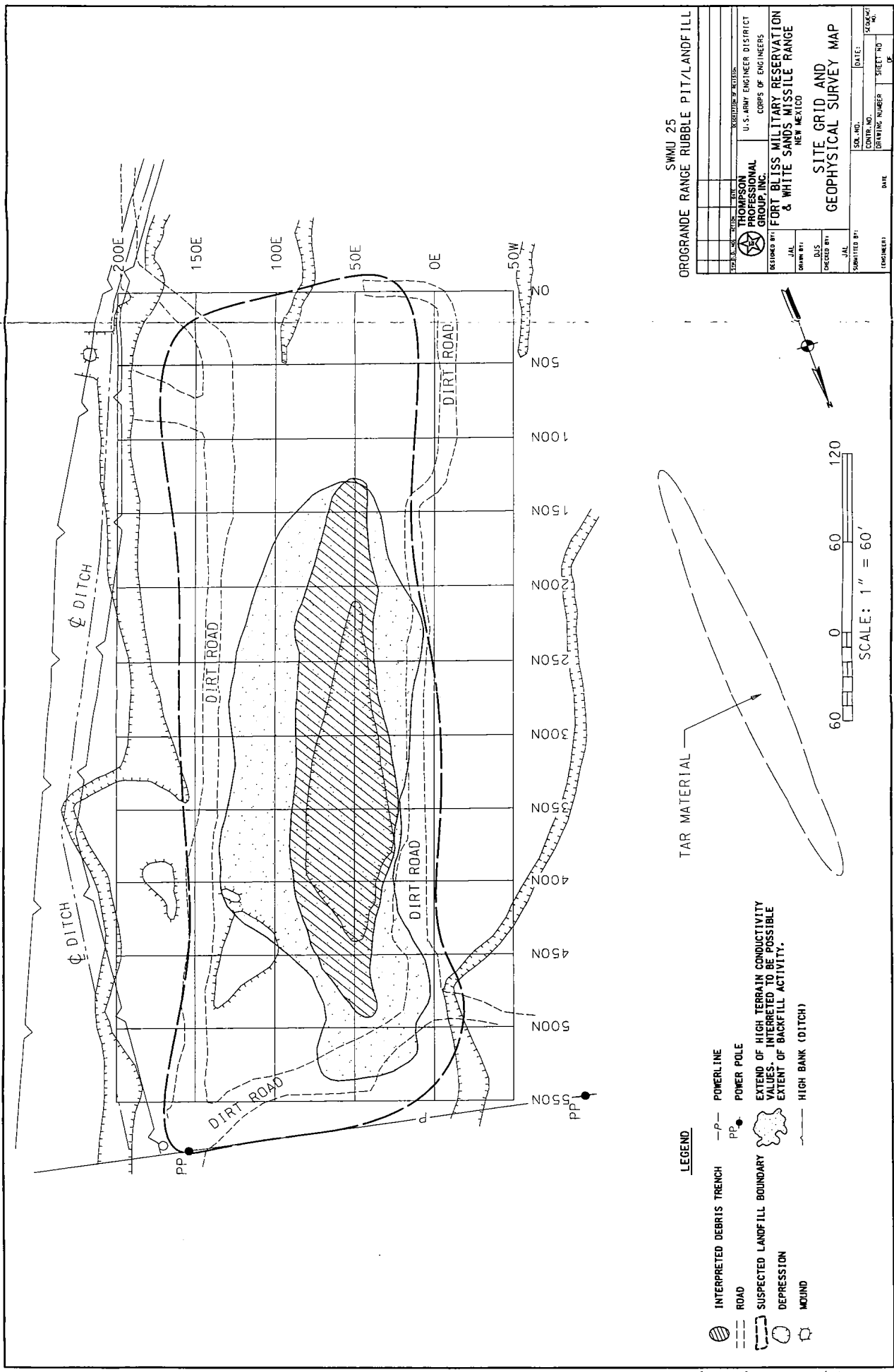


FIGURE 4-4-4  
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area to be surveyed and the capabilities of the geophysical equipment, the grid nodes were established every 50 feet in both the x and y directions.

#### 4.4.5.2. Geophysical Survey

The geophysical survey was performed using EM-31, magnetometry, and GPR techniques as described in Section 3 of this Report. A complete discussion of the geophysical investigation of SWMU 25 is included as Section 5.1 in the Final Report from Golder Associates included as Appendix 2 in this RFI Report. Briefly, the geophysical equipment was deployed, beginning with EM-31 electromagnetics along east-west transect lines spaced every 50 feet along the y-axis of the site grid. Following the completion of the EM-31 phase of the survey, the magnetometry and GPR methods were deployed. When the results of all three methods had been evaluated, a site map referenced to the control grid, delineating the waste trench zones and other pertinent site features, was prepared to provide a basis for locating all subsequent investigative activities (see Site Grid and Geophysical Survey Map, Figure 4-4-4). The results of the geophysical survey are discussed in Subsection 4.4.6.1, Unit Characterization.

#### 4.4.5.3. Soil Gas Survey

Utilizing the results of the geophysical survey, a soil gas sampling survey was conducted to delineate zones of VOC contamination. Soil gas sampling was conducted at 4 points at SWMU 25. Sampling locations exhibiting relatively high VOC concentrations, as indicated by the PID instrument, were given priority when selecting locations for soil boring. Gas samples were submitted for chemical laboratory analysis when the PID screen registered VOC concentrations greater than 10 ppm. The results of samples submitted for chemical laboratory analyses are included in Appendix 11 of this Report. Table 4-4-2, included following this discussion, lists the sample grid locations and the results of the field PID screening. A complete record of each soil gas sampling

event is included in Appendix 7. The methodology and equipment used to perform this survey are discussed in Section 3 of this Report. The locations of the soil gas sampling points are depicted on the Site Sampling Location Map (Figure 4-4-5) which is included in Subsection 4.4.6.

Sample Number	Grid Location	PID Reading (ppm)	Laboratory Sample Taken?
SG25-1	450N/50E	1.9	N
SG25-2	320N/60E	0.2	N
SG25-3	268N/59E	7.1	Y
SG25-4	190N/51E	1.5	N

Table 4-4-2 - SWMU 25 Soil Gas Sampling Results

#### 4.4.5.4. Trench Excavation

An observation pit was excavated into the waste mass at a single trench location in order to examine the waste contents and to confirm data gathered during the geophysical survey concerning the depth of the trench and the thickness of the trench cover. The choice of location for this excavation was based on information generated during the geophysical survey and from the PID screening data resulting from the soil gas survey. A location registering a relatively high VOC gas concentration during the soil gas PID field screening was selected so that the potential existed for encountering the source of the soil gases during the excavation (refer to the Site Sampling Locations Map, Figure 4-4-5, to reference the location of the observation trench). The methodology employed to excavate and examine the trench is included in Section 3 of this Report. The data gathered during the trench excavation provides the basis for Subsection 4.4.6.1, Waste Characterization.

#### 4.4.5.5. Soil Boring and Sampling

Following completion of the trench excavation, the results of all previous site investigative activities were reviewed in order to select the optimum locations

for the soil borings to be drilled at SWMU 25. The locations were selected to yield an areal and directional representation of any subsurface contamination while being situated reasonably close to the waste cells in order to intercept any migrating contamination.

Five soil borings were originally allocated to this site when the RFI Workplan was developed; however, two of these borings were reallocated to other sites after it was determined from the geophysical survey that this site contained only a single waste trench. Thus a total of three borings were drilled at this site. Two of the borings were drilled vertically while one was drilled at an angle of 30 degrees from vertical. The methodology used for soil boring and sampling is included in Section 3 of this Report. The locations of the borings may be referenced on the Site Sampling Locations map (Figure 4-4-5) which is included in Subsection 4.4.6. Detailed information on each of the three soil borings is included in Appendix 3, Soil Boring Logs. In addition to the three soil boring locations illustrated on the map, a fourth location labeled GT25-4 references the site of the geotechnical sample recovered to evaluate the properties of trench cover material. Also, noted in Figure 4-4-5 are the locations of the two surface sampling points sited at the tar material.

Table 4-4-3, which follows, presents a summary of the sampling effort directed at this site.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	TPH	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O <sub>2</sub> )	Hydrogen Sulfide <sup>1</sup>
Soil: Surface Borings <sup>2</sup>	4 21	X X	X X	X X	X X	X X				
Rinsate	1	X	X	X	X					
Split	2	X	X	X	X					
Soil Gas	4	X <sup>1</sup>					X	X	X	X

<sup>1</sup> Field tested

<sup>2</sup> 3 borings to 50' depth, Samples at 0', 5', 10', 20', 30', 40', and 50'

Table 4-4-3 - SWMU 25 Actual Number of Samples and Parameters

#### 4.4.6. Results of Investigation-Findings

The following discussion presents the pertinent findings of the investigative activities conducted at SWMU 25.

##### 4.4.6.1. Unit Characterization

Based on the results of the geophysical survey, and supported by data from the trench excavation, SWMU 25 appears to consist of a single waste trench oriented approximately in a north-south direction along the major longitudinal axes. This finding contradicts the previously developed information, such as the RFA report by Kearney, on the number of trenches that may be located at this site.<sup>50</sup> The Site Grid and Geophysical Survey map, included earlier, displays the results of the geophysical survey in plan view. A detailed discussion of the geophysical survey conducted at this site along with additional supporting maps is included the Final Report produced by Golder Associates and included as Appendix 2 to this Report.

The single waste trench appears to be approximately 370 feet in length and varies in width from 20 feet to 65 feet. As explained in the geophysical report, the effort to establish the depths of the waste trenches was frustrated by poor penetration of the GPR signal and interference from debris within the trenches. The depth of penetration of the GPR signals is partially dependent on the electrical properties of the soils. This depth may be significantly inhibited in soils containing fine grained sediments such as silts and clays. As a result, GPR was only able to reflect the minimum trench depths along the transects where the GPR was deployed. With this clarification, the minimum detected depth of the trench was 9 feet. The actual depth of the trench encountered during

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<sup>50</sup> Ibid., A.T. Kearney, Inc.

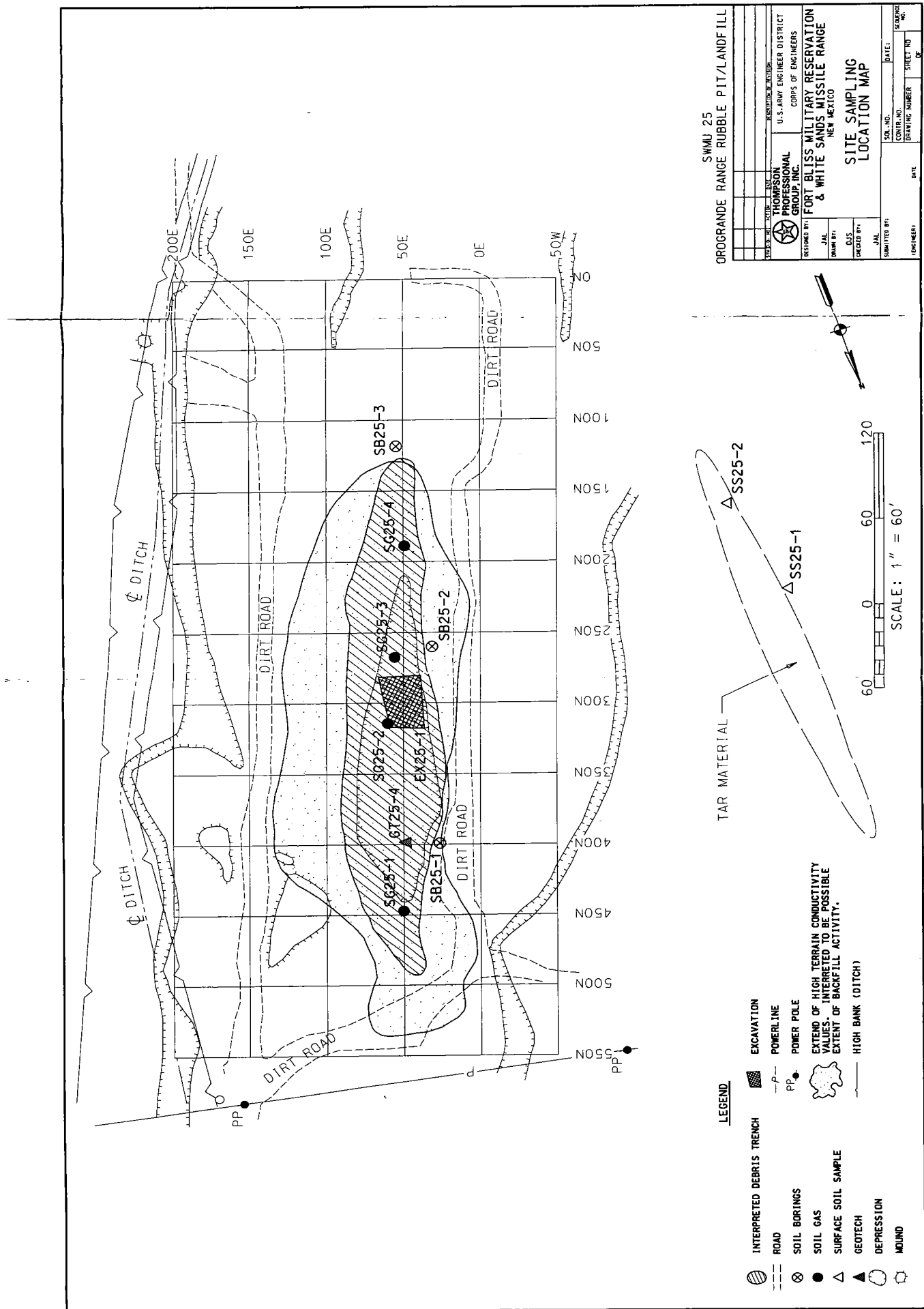
excavation at the location designated EX25-1 on the Site Sampling Location Map, Figure 4-4-5, was 12 feet. (See Table 4-4-4 in the following Subsection).

The detected thickness of the trench cover, as measured by GPR, varied from a minimum of 3 feet to 4.5 five feet along the transects where GPR was deployed. A trench excavation was conducted at this waste unit at a grid y-coordinate of approximately 300N. The thickness of the cover observed during the excavation varied between 5 feet and 7 feet. The detected thickness of the cover at the GPR transect closest to excavation, 350N, was 4.5 feet. Although there is some discrepancy between the observed cover thickness and that detected by GPR, this variation could be explained by the distance between these two locations and the general lack of uniformity in cover thickness detected at this trench.

Based on a visual inspection of the site, the trench covers do not appear to meet the requirements of the New Mexico Solid Waste Bureau regarding side slope gradients. Section 502, Closure and Post-Closure Requirements for Cover Systems for Municipal or Special Waste Landfills, of the New Mexico Solid Waste Management Regulations, specifies that a landfill cover have side slopes equal to, or less than, 25% grade, 1 foot vertical per 4 feet horizontal, and that the top portion of the cover shall have a gradient of between 2% to 5%, sufficient to prevent ponding of water and erosion of the cover.<sup>51</sup> As depicted on the Site Grid and Geophysical Survey Map and documented by photographs included in Appendix 1, a large area of the trench cover has subsided below the grade of the surrounding surface. Such a condition presents an opportunity for ponding of surface runoff during rainfall events; further, preferential pathways for infiltration into the waste mass along the subsidence cracks at the interface of the subsided and non-subsided zones are provided. While the current status of the cover may present a problem for ponding and infiltration of precipitation,

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<sup>51</sup> Ibid., New Mexico Environment Department, Solid Waste Bureau.



OROGRANDE RANGE RUBBLE PIT/LANDFILL

SMMU 25

THOMPSON PROFESSIONAL GROUP, INC.

REGISTERED BY: JAL  
DRAWN BY: JAL  
CHECKED BY: JAL  
SUBMITTED BY: JAL

U.S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS

FORT BLISS MILITARY RESERVATION  
& WHITE SANDS MISSILE RANGE  
NEW MEXICO

**SITE SAMPLING  
LOCATION MAP**

DATE: \_\_\_\_\_

SCALE: 1" = 60'

60' 0' 60' 120'

ENGINEER: \_\_\_\_\_

DATE: \_\_\_\_\_

CONTRACT NO. \_\_\_\_\_

DRAWING NUMBER \_\_\_\_\_

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

the potential for erosion at the site does not appear to be significant. The average gradient across the site is approximately 3%, declining from the northeast to the southwest. Although a deep arroyo lies along the eastern perimeter of the site, it does not currently appear to be a threat to undercut the landfill and expose the waste mass.

The tar material located to the west of the site was examined in detail. The material appears to be common roofing tar. The tar is deposited in a narrow, thin sheet along a shallow gully which extends from the road leading into the site to south beyond the extents of the site. It may be deduced that this tar was originally disposed at a point near the road from where it may have flowed in a molten state along the channel formed by the gully. The full extent of this tar flow was examined. The flow did not appear to be wider than a few feet at its widest point or thicker than 1 inch at the thickest point. The vegetation in the immediate vicinity of the flow did not appear to be stressed in any manner. Reference to the tar flow may be made on the Site Grid and Geophysical Survey Map and Site Sampling Location Map and in photographs included in Appendix 1 (Page 21-Bottom, Page 22-Top).

#### 4.4.6.2. Waste Characterization

Data on waste characterization for SWMU 25 was derived from the trench excavation. The location of the excavation, identified as EX25-1, may be referenced on the Site Sampling Location Map (Figure 4-4-5). The results of the excavation are presented in tabular form as follows:

Depth Interval (ft.)	Waste Description
0 - 7	Trench cover: silty clayey sand, tan
7 - 9	Field communications wire, wood scrap, plastic sheeting & garbage bags
9 - 10	Tree roots, plant debris, plastic sheeting & garbage bags, concrete blocks, asphalt, tar paper, pvc pipe, misc. construction debris
10 - 12	Metal banding, large metal chain, metal shelf supports, toilet, beer cans, tubes for transporting small rockets (dunnage), asphalt
12 - 13	Bottom of trench

Table 4-4-4 – SWMU 25 Waste Trench Excavation

The types of waste observed during the excavation are consistent with those included in the historical records mentioned in Subsection 4.4.1.

#### 4.4.6.3. Sampling Results

The results of the chemical laboratory analyses of soil samples collected from SWMU 25 are contained in Appendix 11 of this RFI Report. None of the chemical analyses of samples collected at SWMU 25 detected constituent concentrations greater than the estimated background concentrations. The data evaluation and validation methodology is discussed in Subsection 4.1. Tables documenting the data validation and evaluation processes are included in Appendices 8 and 9, respectively. Based on the data validation process, it is reasonable to conclude that the data collected from this sight is reliable and representative of the conditions at the time of the investigation at SWMU 25.

The results of soil samples submitted for geotechnical laboratory analyses are presented in Table 4-4-5. The complete geotechnical laboratory report is included as Appendix 5 to this Report.

The results of the geotechnical soil sample, GT25-4, collected from the cover material of the waste trench merits discussion. The reported permeability, or

saturated hydraulic conductivity, is 7.63E-07 cm/s. Section 502, Closure and Post-Closure Requirements for Cover Systems for Municipal or Special Waste Landfills, of the New Mexico Solid Waste Management Regulations, (NMSWMR) specifies that a landfill cover have an infiltration layer at least 18 inches thick with a saturated hydraulic conductivity equal to, or less than, 1E-05 cm/s, or that the conductivity be less than the natural subsurface soils surrounding the landfill.<sup>52</sup> The cover material tested as GT25-4 exceeds the NMSWMR Section 502 specification for conductivity by a full order of magnitude, and also has a lower conductivity than the native soils, as evidenced by the results of the other geotechnical samples tested.

Sample ID	Depth Interval (ft.)	Moisture Content (%)	Dry Unit Weight (lbs/ft <sup>3</sup> )	Permeability (cm/s)	Organic Content (%)	pH Soil/Solid	CEC (meq/100g)
GT25-2-1	0 - 2	3.4	103	1.97E-03	1.12	9.1	10.5
GT25-3-1	11 - 12	3.6	98	1.07E-03	0.30	9.4	6.37
GT25-3-2	31 - 32	3.6	112	2.86E-05	0.20	9.7	5.83
GT25-3-3	50 - 51.5	6.3	91	1.88E-04	0.69	9.7	16.2
GT25-4	0 - 1	3.9	122.7	7.63E-07	1.08	9.2	11.6

Table 4-4-5 - SWMU 25 Geotechnical Results

#### 4.4.7. Contaminant Characteristics

No analytes were found to be above background concentrations.

#### 4.4.8. Potential Receptor Identification

SWMU 25 is located in a remote area on a vast military installation in an arid desert. The area around this site is part of the Orogrande Range Camp with only the small

<sup>52</sup> Ibid., New Mexico Environment Department, Solid Waste Bureau.

range camp cantonment area being populated. Human access to the site and adjacent lands is restricted to military personnel working or residing at the McGregor Range Camp, other military personnel in the area during training exercises, civilians and military personnel engaged in hunting activities, and civilian contractors working on projects for the military. Since the SWMU is located on a military installation, it is assumed that public access is generally restricted; however, there are no physical barriers to prevent unauthorized personnel from entering this area, and Range Camp personnel report that such unauthorized entry is not uncommon.

The scope and depth of information needed on the population of potential receptors and the relative risk to those receptors are directly related to whether contamination is confirmed, and at what concentration level it is confirmed, and the potential for exposure based on a developed model for the migration of such contamination. According to the Workplan for this RFI, if it is determined that contaminants exist at this site at levels that exceed EPA Region 3 Risk-Based Concentrations (RBCs) at a statistically significant level of confidence, then a baseline qualitative Human Health Risk Assessment (HHRA) will be performed at this site. This HHRA would be performed utilizing guidance as provided by the EPA documents *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)*<sup>53</sup> and *Risk Assessment Guidance for Superfund, Volume I : Human Health Evaluation Manual Supplemental Guidance*.<sup>54</sup> None of the samples collected from SWMU 25 exhibited levels of contamination equal to, or greater than, the relevant RBCs. Therefore, no HHRA has been, or is scheduled to be, performed at this time.

Another aspect of risk assessment is an ecological risk assessment, which in many ways is more complex than an HHRA. This is due, in large part, to the need to evaluate

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<sup>53</sup> USEPA Office of Solid Waste and Emergency Response, Toxics Integration Branch, Risk Assessment Guidance for Superfund, Volume I : Human Health Evaluation Manual Supplemental Guidance, OSWER Directive 9285:6-03, Washington, DC, 1991.

<sup>54</sup> Ibid.

multiple species, the level of ecological structure to be considered (species, populations, ecosystems, etc.), and the less established bench marks for chronic toxicity, etc. The process for conducting a screening-level ecological risk assessment (SERA) was discussed in the Workplan for this RFI and will not be repeated here.<sup>55</sup> No visible signs of stressed vegetation were apparent at the site. By the nature of the activities that have taken place at this site, the surface area where the waste trenches were constructed has been impacted, and the appearance is markedly different from the surrounding undisturbed area. However, the disturbed area is revegetating. There are no surface water bodies in the vicinity of SWMU 25.

Since no contamination was detected at this site, a risk assessment is not relevant.

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<sup>55</sup> USEPA Risk Assessment Forum, Framework for Ecological Risk Assessment, EPA/630/R-92/001, (February), Washington, DC, 1992.



**SWMU 27**



#### 4.5. SWMU 27-Doña Ana Range Rubble Pit/Landfill

Solid Waste Management Unit (SWMU) 27 is known as the Doña Ana Rubble Pit/Landfill. This site has also been identified as Landfill No. 12 (FTBL-012). The landfill is located about 0.7 miles southwest of the Doña Ana Range Camp. The Range Camp, which lies at the southern base of the Organ Mountains, is located on the Fort Bliss Military Reservation which covers approximately 1.2 million acres of land in New Mexico and Texas near El Paso, Texas.<sup>56</sup> The site is located in the New Mexico portion of the Fort Bliss Military Reservation within the Hueco Basin of the New Mexico Highland section of the Basin and Range province approximately 25 miles north of El Paso.<sup>57</sup> An Aerial Photograph (Figure 4-5-1) of the site is located on the following page.

The Site Location Map (Figure 4-5-2) shows the Doña Ana Range Camp area, the location of SWMU 27 and the other SWMUs in this area, and is located following the Aerial Site View.

##### 4.5.1. Unit Description and Characteristics

SWMU 27 has been reported as a trench-type landfill, underlain and covered with soil.<sup>58</sup> SWMU 27 is currently inactive, but was operated and is owned by Fort Bliss. The specific topography of the site is illustrated on the SWMU Site Plan (Figure 4-5-3) located on the following pages. The landfill has previously been reported as encompassing an area of two acres;<sup>59</sup> however, the results of a site survey conducted by Thompson personnel during the development of the RFI Workplan indicate that the site

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<sup>56</sup> A.T. Kearney, Inc., RCRA Facility Assessment PR/VSI Report: U.S. Army Air Defense Artillery Center and Fort Bliss, Texas, Prepared for the U.S. Environmental Protection Agency, Chicago, IL, 1989.

<sup>57</sup> Section 2, Environmental Setting for a general overview of the geology and hydrogeology in this area.

<sup>58</sup> Ibid., A.T. Kearney, Inc.

<sup>59</sup> U.S. Army Environmental Hygiene Agency, Final Report, Hazardous Waste Consultation No. 38-26-1647-90, Evaluation of Solid Waste Management Units, Fort Bliss, Texas, August 3-7 1987 & September 26-29, 1989.

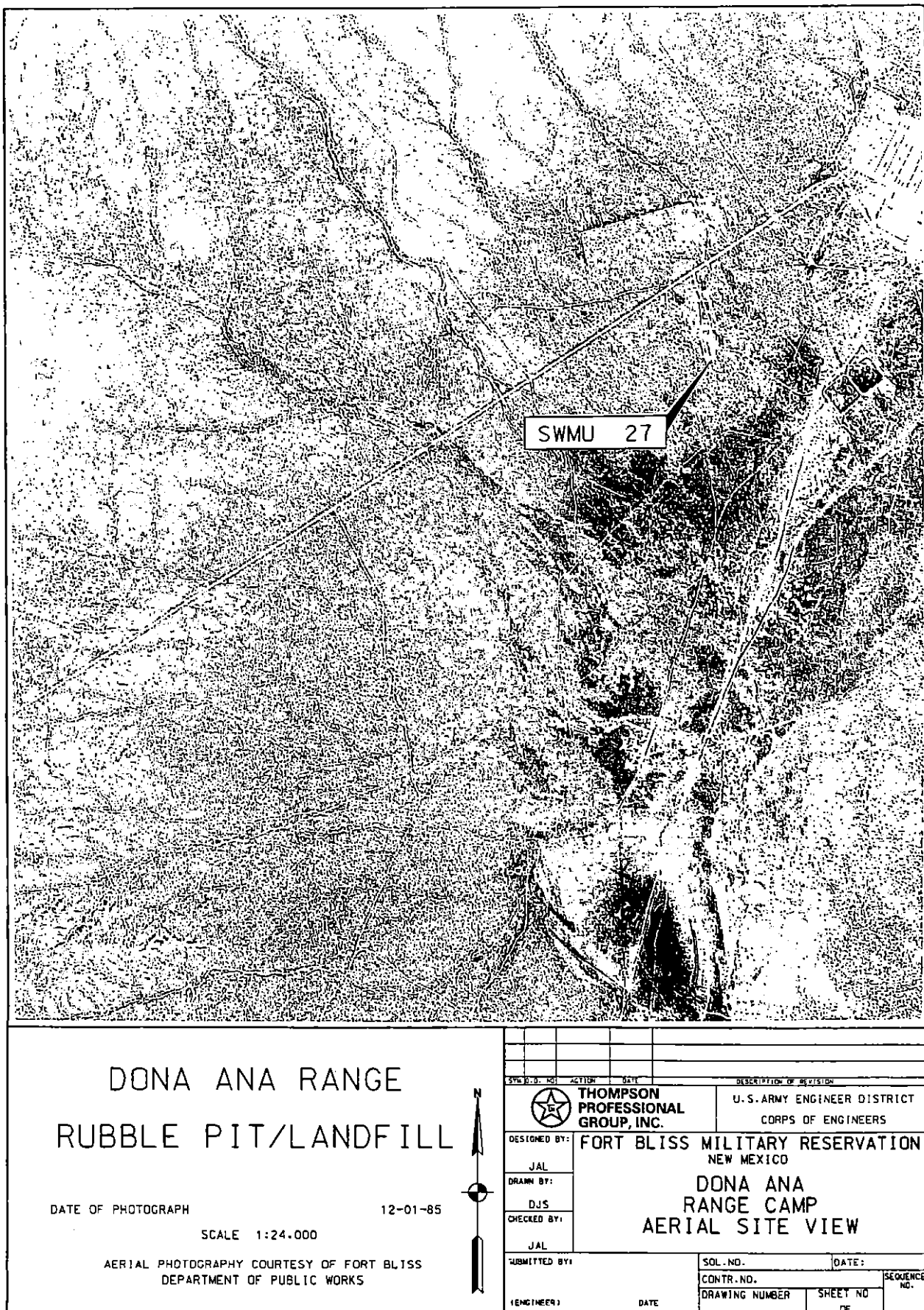


Figure 4-5-1  
Section 4 – Page 84

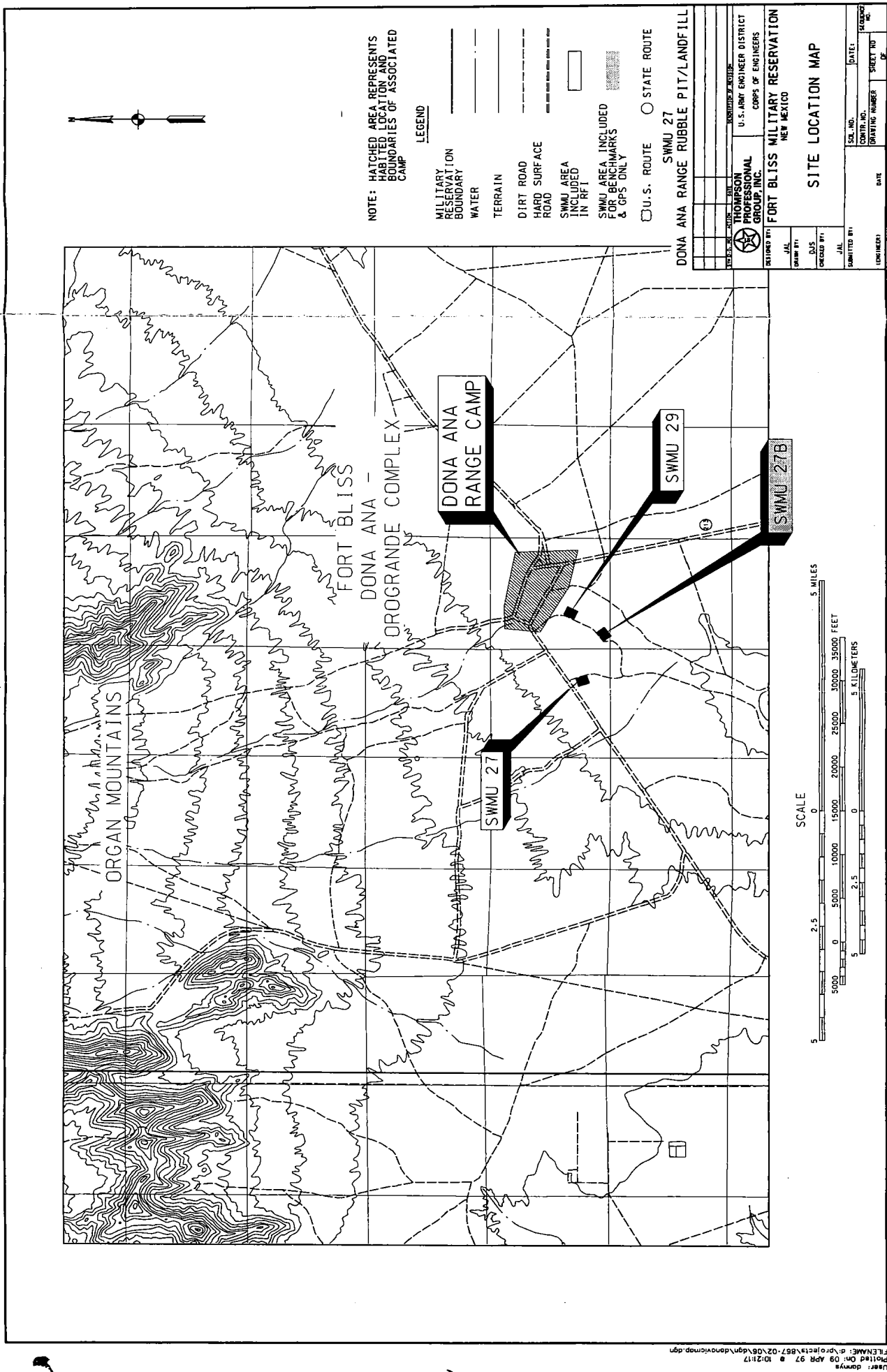


FIGURE 4-5-2  
Section 4 - Page 85

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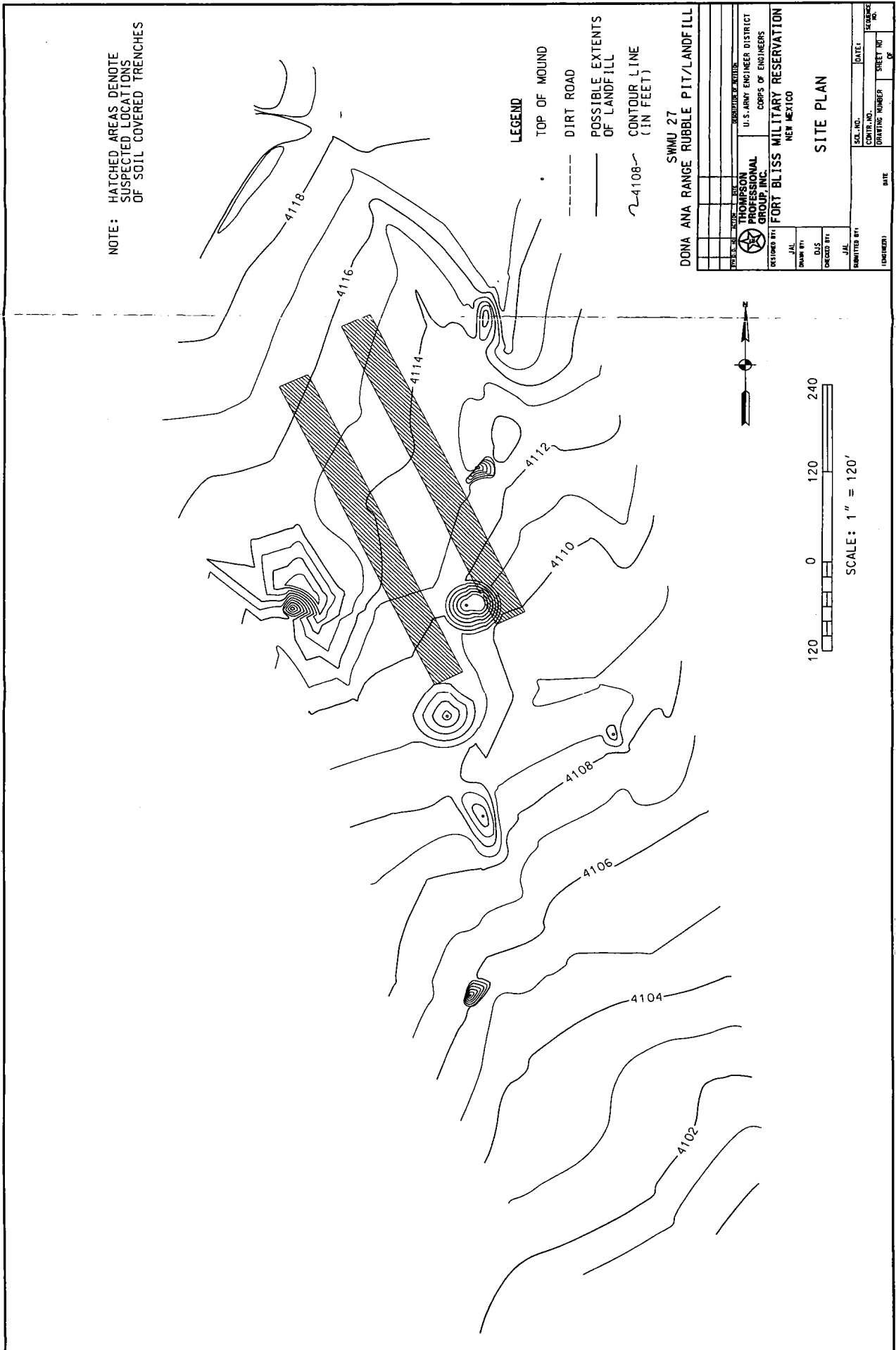


FIGURE 4-5-3  
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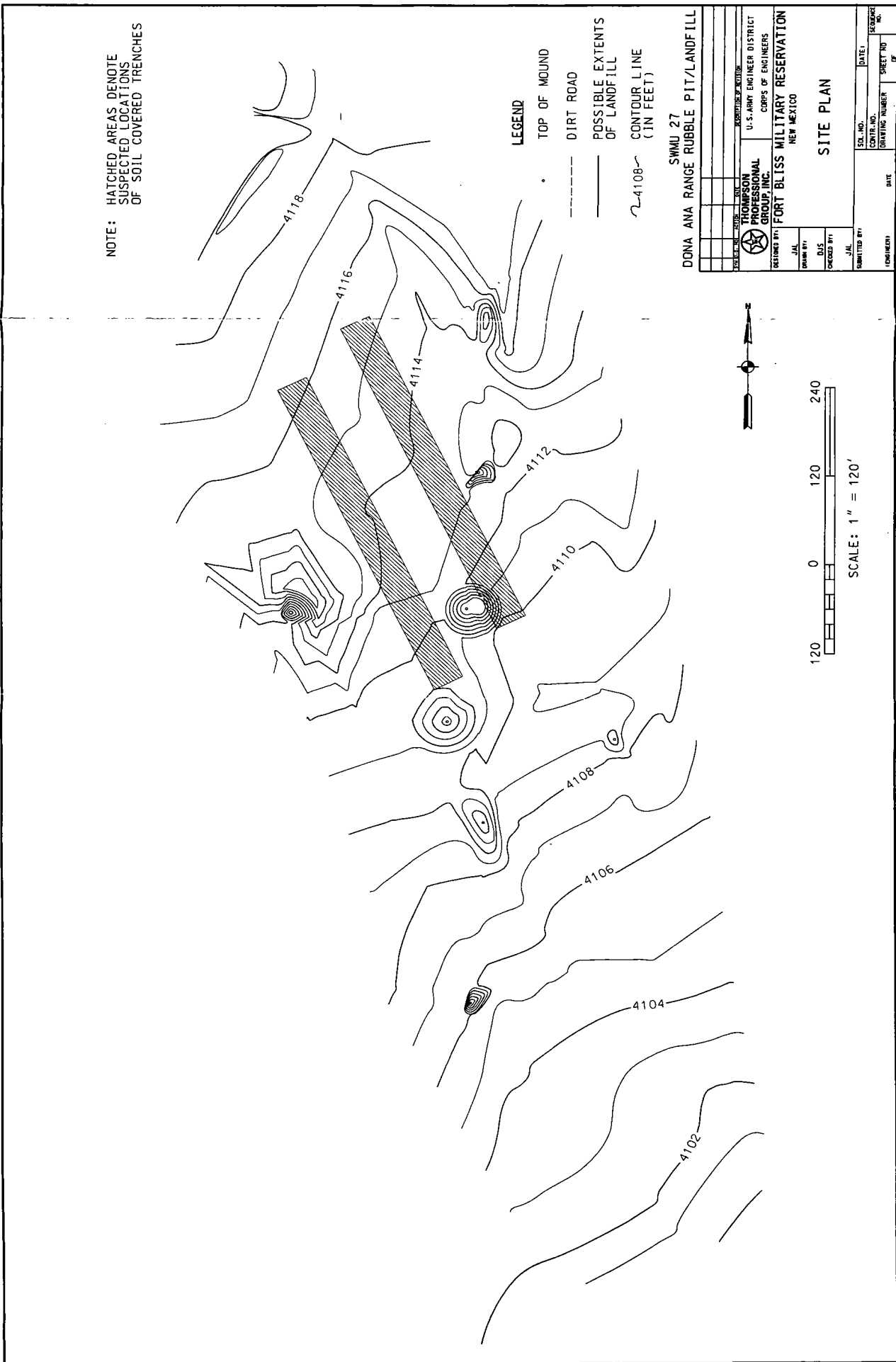


FIGURE 4-5-3  
SECTION 4 - PAGE 86

may actually occupy an area of five to seven acres. The RFA Report by A.T. Kearney, Inc., states that the site contains two waste pits: one pit which was opened in 1983 and was still active in 1989, the period of the RFA; and a second inactive pit, situated immediately east of the active pit. The RFA describes the active pit as measuring 250 feet long by 40 feet wide and 25 feet deep and as having an original length of 450 feet. This pit was reportedly covered with natural soil and graded to match the existing ground contour in 1994 after it caught fire.<sup>60</sup> The older pit is reported to have begun receiving waste from the Range Camp in the early 1950s. The dimensions of this pit are reported in the RFA to be similar to those of the newer pit. The historical records do not indicate when the older pit was closed and covered, but it could be inferred that this might have occurred at approximately the same time that the newer pit was opened in 1983. The landfill is reported in the RFA to have received sanitary waste, wood cardboard, paper, arms munitions, tires, plastic, scrap metal, and other material from the Doña Ana Range Camp.

This site is set in a desert climate with desert scrub and grass vegetation. There are no nearby surface water bodies or rivers, and any streams are intermittent in nature, flowing only during significant rainfall events. In this area the groundwater is reported to be approximately 300 feet from the ground surface, although there may be perched groundwater at lesser depths.<sup>61</sup>

#### 4.5.2. Interim Measures

There have been no known documented interim corrective measures taken in the past at SWMU 27 for mitigation of contamination. Furthermore, no indicators of contamination, such as stressed vegetation or discolored soils, were detected during the

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<sup>60</sup> U.S. Army Corps of Engineers, Statement of Work, Attachment 2, Summary: Fort Bliss Solid Waste Management Units (SWMU), 1995.

<sup>61</sup> Section 2, Environmental Setting for a General Overview of the Geology and Hydrogeology in this Area.

course of the field operations conducted at this site; therefore, no interim measures were implemented following the site investigation.

#### 4.5.3. Site Specific RFI Objectives

The specific RFI objectives for this site are as follows:

1. Assure that the site is safe for field operations by conducting UXO site clearance procedures prior to initiating any investigative activities.
2. Determine the number, areal extents, and depths of the waste units present at SWMU 27.
3. Evaluate the thickness and other characteristics of the soil covers in terms of the capping requirements of the New Mexico Solid Waste Management Regulations, EIB/SWMR-4.<sup>62</sup>
4. Assess the susceptibility of the surface soils at the site to erosion.
5. Determine if, and to what extent, a contaminant release from the waste units to the environment has occurred. If such a release has occurred, characterize the nature of that contamination and the potential for further releases, and assess the risk posed by this contamination to potential receptors in the vicinity of the site.
6. Record and map the precise location of all survey points delineating the site and all sampling points established during this investigation.
7. Construct two permanent bench mark monuments tied to the New Mexico State Plane Coordinate System and referenced to the current North American Datum

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<sup>62</sup> New Mexico Environment Department, Solid Waste Bureau, New Mexico Solid Waste Management Regulations, EIB/SWMR-4, July 18, 1994.

(NAD) so that the site and all recorded survey points may be readily located in the future.

#### 4.5.4. Data Collection Plan

Four distinct but interrelated tasks comprise the data generation effort at this site: geophysical survey, soil gas sampling, trench excavation, and soil boring. In addition, surface soil samples would be field tested for explosives as part of the UXO site safety clearance procedures. The results of the geophysical survey using GPR, EM, and magnetometry methods were to be used to establish the number, boundaries, and depths of the waste trenches and to provide a basis for locating the soil gas sampling points. Data generated from the soil gas sampling program, in combination with the results from the geophysical studies, were then to provide a basis for optimizing the location of the trench excavation and the siting of soil borings. The selection of the optimal location for the excavation of the waste trench and visual inspection of the waste mass were to be based on obtaining the most representative sampling of the buried materials and on inspecting any waste items of particular interest, such as waste drums. Technical details on the procedures to be used in completing each of these four tasks are located in Section 3.

Table 4-5-1, which follows this subsection, summarizes the planned data collection effort for this site as envisioned in the RFI Workplan. Per the Workplan, a minimum of two soil gas sampling points was to be allocated to each waste trench identified by the geophysical survey. Based on the prior information concerning the number of waste trenches that might be present at this site, a total of 10 sampling points were allocated among the trenches. A total of five soil borings were planned for SWMU 27 with one of the borings to be drilled at an angle such that the boring terminated beneath a waste trench. As with the soil gas sampling points, the locations of these borings were to be determined based on the results of the geophysical survey. In addition, the results of the soil gas survey would be reviewed to optimize placement of the borings.

Four surface soil samples were to be taken at two separate locations to assess potential soil contamination in the vicinity of the tar mound.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O2)	Hydrogen Sulfide <sup>1</sup>
Soil Surface Borings <sup>2</sup>	30	X	X	X	X				
Rinsate	1	X	X	X	X				
Split	3	X	X	X	X				
Soil Gas	10	X <sup>1</sup>				X	X	X	X

<sup>1</sup> Field tested

<sup>2</sup> 5 borings to 40' depth, Samples at 0', 5', 10', 20', 30', and 40'

Table 4-5-1 – SWMU 27 Proposed Number of Samples and Parameters

#### 4.5.5. Investigation & Sampling Summary

The field investigation of SWMU 27 consisted of the following activities: UXO site clearance and site survey; layout of the coordinate grid as a basis for conducting the geophysical survey and subsequent sampling procedures; the geophysical survey to locate and determine the extents of the waste units; the soil gas survey to detect zones of possible VOC contamination; the trench excavation to characterize the buried wastes; and soil boring to recover chemical and geotechnical samples for laboratory analysis and to log the geologic strata beneath the surface of the site.

##### 4.5.5.1. UXO Site Clearance

Three surface soil samples were field tested for explosives as a part of the UXO site safety clearance activity. This procedure is briefly discussed in Section 3.1 of this Report and in Appendix 2 of the Workplan for this RFI. Two of the samples were collected at random and a third was located near the depression on the western edge of the site. The results of these field tests are presented in Subsection 4.5.6. These sampling points are designated SS27-CMS-1 through SS27-CMS-3 and may be located on the Site Sampling Location Map (Figure 4-5-5) included later in Section 4.5.6.

#### 4.5.5.2. Coordinate Site Grid

The x-y coordinate grid was established with the y-axis oriented to the north, the x-axis positive to the east, with the origin located at a point approximately 2/3 of distance from the northern end of the site to the southern end (refer to the Site Grid and Geophysical Survey Map, Figure 4-5-4, which follows this page). This grid provided site control for the geophysical survey and all subsequent site activities. Based on the size of the area to be surveyed and the capabilities of the geophysical equipment, the grid nodes were established every 50 feet in the y-direction and 100 feet in the x-direction.

#### 4.5.5.3. Geophysical Survey

The geophysical survey was performed using EM-31, magnetometry, and GPR techniques as described in Section 3 of this Report. A complete discussion of the geophysical investigation of SWMU 27 is included as Section 5.1 in the Final Report from Golder Associates included as Appendix 2 in this RFI Report. Briefly, the geophysical equipment was deployed, beginning with EM-31 electromagnetics along east-west transect lines spaced every 50 feet along the y-axis of the site grid. Following the completion of the EM-31 phase of the survey, the magnetometry and GPR methods were deployed. When the results of all three methods have been evaluated, a site map referenced to the control grid, delineating the waste trench zones and other pertinent site features, was prepared to provide a basis for locating all subsequent investigative activities (see Site Grid and Geophysical Survey Map, Figure 4-5-4). The results of the geophysical survey are discussed in Subsection 4.5.6.1, Unit Characterization.

#### 4.5.5.4. Soil Gas Survey

Utilizing the results of the geophysical survey, a soil gas sampling survey was conducted to delineate zones of VOC contamination. Soil gas sampling was conducted at 19 points at SWMU 27. Sampling locations exhibiting relatively

high VOC concentrations, as indicated by the PID instrument, were given priority when selecting locations for soil boring. Gas samples were submitted for chemical laboratory analysis when the PID screen registered VOC concentrations greater than 10 ppm. The results of samples submitted for chemical laboratory analyses are included in Appendix 11 of this Report. Table 4-5-2, included following this discussion, lists the sample grid locations and the results of the field PID screening. A complete record of each soil gas sampling event is included in Appendix 7. The methodology and equipment used to perform this survey are discussed in Section 3 of this Report. The locations of the soil gas sampling points are depicted on the Site Sampling Location Map (Figure 4-5-5) which is included in Subsection 4.5.6.

Sample Number	Grid Location	PID Reading (ppm)	Laboratory Sample Taken?
SG27-1	743N/312E	9.3	N
SG27-2	550N/321E	19.5	Y
SG27-3	450N/325E	9.1	N
SG27-4	353N/309E	7.2	N
SG27-5	250N/330E	8.4	N
SG27-6	233N/232E	1.3	N
SG27-7	105N/182E	12.6	Y
SG27-8	50S/221E	4.5	N
SG27-9	148SW/224E	1.9	N
SG27-10	250S/228E	0.2	N
SG27-11	350S/121E	1.7	N
SG27-12	250S/115E	6.8	N
SG27-13	500N/150E	0.0	N
SG27-14	575N/60E	0.0	N
SG27-15	650N/60E	3.4	N
SG27-16	600N/215E	0.5	N
SG27-17	650N/225E	0.5	N
SG27-18	630N/170E	0.0	N
SG27-19	810N/180E	2.0	N

Table 4-5-2 - SWMU 27 Soil Gas Sampling Results

#### 4.5.5.5. Trench Excavation

Initially, excavation began on an observation pit into the waste mass approximately at grid reference 540N/325E in order to examine the waste contents and to confirm data gathered during the geophysical survey concerning the depth of the trench and the thickness of the trench cover. This excavation was abandoned and an alternate location was selected for the observation pit on the advice of the on-site UXO specialists (see Subsection 4.5.6.2, Waste Characterization, for a discussion of this subject) The choice of locations for both excavations was based on information generated during the geophysical survey and from the PID screening data resulting from the soil gas survey. A location registering a relatively high VOC gas concentration during the soil gas PID field screening was selected so that the potential existed for encountering the source of the soil gases during the excavation (refer to the Site Sampling Location Map, Figure 4-5-5, to reference the locations of the observation trenches). The methodology employed to excavate and examine the trenches is included in Section 3 of this Report. The data gathered during the trench excavation provides the basis for Subsection 4.5.6.6, Waste Characterization.

#### 4.5.5.6. Soil Boring and Sampling

Following completion of the trench excavation, the results of all previous site investigative activities were reviewed in order to select the optimum locations for the soil borings to be drilled at SWMU 27. The locations were selected to yield an areal and directional representation of any subsurface contamination while being situated reasonably close to the waste cells in order to intercept any migrating contamination.

Five soil borings were originally allocated to this site when the RFI Workplan was developed; however, three additional borings were allocated to this site after it was determined from the geophysical survey that this site appeared to contain seven waste trenches rather than two, as was previously believed. Thus

a total of eight borings were drilled at this site. Seven of the borings were drilled vertically while one was drilled at an angle of 30 degrees from vertical. The methodology used for soil boring and sampling is included in Section 3 of this Report. The locations of the borings may be referenced on the Site Sampling Location map (Figure 4-5-5) which follows this page. Detailed information on each of the eight soil borings is included in Appendix 3, Soil Boring Logs. In addition to the eight soil boring locations illustrated on the map, a ninth location labeled GT27-9 references the site of the geotechnical sample recovered to evaluate the properties of trench cover material. Also noted in Figure 4-5-5 are the locations of the 3 UXO site clearance surface sampling points.

Table 4-5-3, which follows, presents a summary of the sampling effort directed at this site.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O <sub>2</sub> )	Hydrogen Sulfide <sup>1</sup>
Soil: Surface Borings <sup>2</sup>	48	X	X	X	X				
Rinsate	2	X	X	X	X				
Split	5	X	X	X	X				
Soil Gas	19	X <sup>1</sup>				X	X	X	X

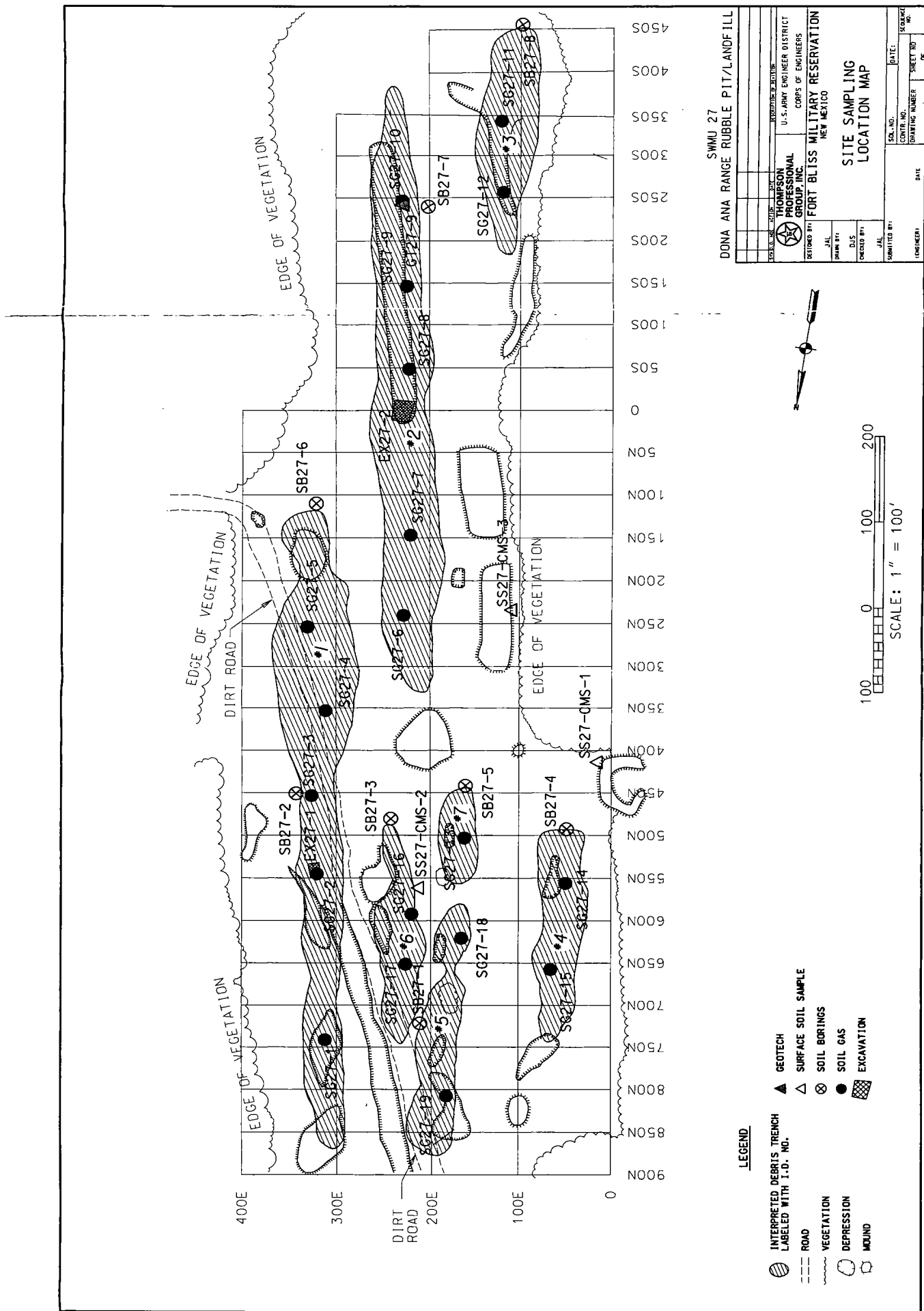
<sup>1</sup> Field tested

<sup>2</sup> 8 borings to 40' depth, Samples at 0', 5', 10', 20', 30', and 40'

Table 4-5-3 – SWMU 27 Actual Number of Samples and Parameters

#### 4.5.6. Results of Investigation-Findings

The following discussion presents the pertinent findings of the investigative activities conducted at SWMU 25.



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#### 4.5.6.1. Unit Characterization

Based on the results of the geophysical survey, and supported by data from the trench excavation, SWMU 27 appears to consist of two major and five minor waste trenches. The seven waste trenches are oriented parallel to each other in a north-south direction along their major longitudinal axes. The Site Grid and Geophysical Survey map, included earlier, displays the results of the geophysical survey in plan view. A detailed discussion of the geophysical survey conducted at this site along with additional supporting maps is included the Final Report produced by Golder Associates and included as Appendix 2 to this Report.

The two major waste trenches, #1 and #2, are approximately 750 feet and 720 feet in length, respectively. The widths of these two units vary from 30 feet to 90 feet for #1 and from 20 feet to 70 feet for #2. The 5 minor trenches vary from 110 feet to 300 feet in length and from 10 feet to 70 feet in width.

As explained in the geophysical report, the effort to establish the depths of the waste trenches was frustrated by poor penetration of the GPR signal and interference from debris within the trenches. The depth of penetration of the GPR signals is partially dependent on the electrical properties of the soils. This depth may be significantly inhibited in soils containing fine-grained sediments such as silts and clays. As a result, GPR was only able to estimate the minimum trench depths along the transects where the GPR was deployed. With this clarification, the minimum detected depths of the two major trenches varied from 6 feet to 9 feet, with those depths of the minor trenches varying from 6 feet to 8 feet.

The estimated thickness of the trench covers, as measured by GPR, varied from a minimum of 2 feet to 4 feet. The thicknesses of the covers observed during the 2 trench excavations conducted at this site were approximately 5.5 feet at EX27-1 (trench #1) and 6 feet at EX27-2 (trench #2).

Based on a visual inspection of the site, the trench covers do not appear to meet the requirements of the New Mexico Solid Waste Bureau regarding side slope gradients. Section 502, Closure and Post-Closure Requirements for Cover Systems for Municipal or Special Waste Landfills of the New Mexico Solid Waste Management Regulations, specifies that a landfill cover have side slopes equal to, or less than, 25% grade, 1 foot vertical per 4 feet horizontal, and that the top portion of the cover shall have a gradient of between 2% to 5%, sufficient to prevent ponding of water and erosion of the cover.<sup>63</sup> As depicted on the Site Grid and Geophysical Survey Map, certain areas of every cover have subsided below the grade of the surrounding surface. Subsidence presents an opportunity for ponding of surface runoff during rainfall events; further, preferential pathways for infiltration into the waste mass along the subsidence cracks at the interface of the subsided and non-subsided zones are provided.

The potential for erosion at the site is significant. When visiting the site during the course of developing the RFI Workplan in October, 1995, and again in January, 1996, easy access to the site was gained at an entrance way located at the northern end of the site. By the commencement of the field investigation at the beginning of October, 1996, this entrance and much of the dirt road crossing the site from north to south had almost completely eroded away (refer to Appendix 1, Photographic Documentation). Fort Bliss personnel reported that unusually heavy rains during the preceding spring and summer were the cause of this erosion. Although the average gradient across the site is approximately

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<sup>63</sup> Ibid., New Mexico Environment Department, Solid Waste Bureau.

1%, declining from the north to south, the site is located very near to the southern extent of the Organ Mountains. The proximity of this site to this mountain range, with the ensuing volume and velocity of runoff likely to reach the site from the direction of the mountains during periods of intense rainfall, would tend to elevate the potential for erosion at SWMU 27 beyond that indicated by the site-specific gradient. Also, large areas of the site lack significant vegetation to retard soil erosion.

#### 4.5.6.2. Waste Characterization

Data on waste characterization for SWMU 27 was derived from the trench excavations. The locations of the excavations, identified as EX27-1 and EX27-2, may be referenced on the Site Sampling Location Map (Figure 4-5-5). The results of the excavations are presented in tabular form as follows:

Depth Interval (ft.)	Waste Description
0 - 5.5	Trench cover: silty, clayey sand, tan
5.5 - 7.5	Metal strapping, misc. metal debris
7.5 - 9	Several 40 mm anti-aircraft cartridges with intact primers - excavation abandoned upon advice of on-site UXO specialists, Fort Bliss EOD contacted

Table 4-5-4 - SWMU 27 Waste Trench Excavation: EX27-1

Depth Interval (ft.)	Waste Description
0 - 6	Trench cover: silty, clayey sand, tan
6 - 7	Metal strapping, plastic sheeting and garbage bags
7- 9	Tire inner tube, wood scrap, communications wire, metal banding, concertina wire, port-o-san
9 - 10	Foam packaging, metal banding, plastic sheeting, empty metal drum, empty anti-freeze container
10 - 13	Trench bottom: soil similar to cover material - brown, clayey sand

Table 4-5-5 - SWMU 27 Waste Trench Excavation: EX27-2

The types of waste observed during the excavation are consistent with those included in the historical records mentioned in Subsection 4.5.1. It should be emphasized that the initial excavation conducted at EX27-1 was interrupted and abandoned when several 40 mm anti-aircraft rounds, as identified by the UXO specialists, were unearthed, brought to the surface, and inspected by the UXO team. The UXO team reported this incident to the Fort Bliss office responsible for EOD matters. The rounds were flagged and left at the surface at the location of EX27-1 for the Fort Bliss EOD personnel to recover. This excavation was then refilled at the same time that the excavation at EX27-2 was refilled.

#### 4.5.6.3. Sampling Results

The results of the chemical laboratory analyses of soil samples collected from SWMU 27 are contained in Appendix 11 of this RFI Report. Table 4-5-6, Analytical Results, presents a listing of samples where a chemical constituent was detected by the laboratory at a level exceeding the estimated background concentration for that particular compound. The data evaluation and validation methodology is discussed in Subsection 4.1. Tables documenting the data validation and evaluation processes are included in Appendices 8 and 9, respectively. Based on the data validation process, it is reasonable to conclude that the data collected from this sight is reliable and representative of the conditions at the time of the investigation at SWMU 27.

The results of soil samples submitted for geotechnical laboratory analyses are presented in Table 4-5-7. The complete geotechnical laboratory report is included as Appendix 5 to this Report.

One sample which was tested for metals revealed a barium concentration slightly above the calculated background level. This exceedance of background concentration and may reasonably be explained by geochemical variations in the soils. One sample tested for VOCs detected xylene at a level slightly above the

calculated background level. It is a matter of qualitative judgment whether this organic exceedance of background concentration represents a significant level of contamination. None of the detected sample constituent concentrations that exceeded background levels equaled or exceeded the related Risk-Based Concentrations.

The results of the geotechnical soil sample, GT27-9, collected from the cover material of waste trench #2 merits discussion. The reported permeability, or saturated hydraulic conductivity, is 1.25E-04 cm/s. Section 502, Closure and Post-Closure Requirements for Cover Systems for Municipal or Special Waste Landfills, of the New Mexico Solid Waste Management Regulations, specifies that a landfill cover have an infiltration layer at least 18 inches thick with a saturated hydraulic conductivity equal to, or less than, 1E-05 cm/s, or that the conductivity be less than the natural subsurface soils surrounding the landfill.<sup>64</sup> The cover material tested as GT25-4 has a lower conductivity than the native soils, as evidenced by the results of the other geotechnical samples tested, and the conductivity is lower than the stated level of 1E-05 cm/s.

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<sup>64</sup> Ibid., New Mexico Environment Department, Solid Waste Bureau.

Sample Number	Depth Interval (ft.)	Parameter	CAS Number	Results (mg/Kg)	Estimated Background Concentration (mg/Kg)	Percent Exceedence of Background	Risk-Based Concentration <sup>1</sup> (mg/Kg)	Exceeds Risk-Based Concentration?
SB27-1-2	5-7	Total Xylenes <sup>2</sup>	1330-20-7	0.016	0.0056	286	160,000	No
SB27-3-6	39-41	Barium	7440-39-3	824	544	151	5500	No

<sup>1</sup>Values are from EPA Region 3 Risk-Based Concentrations for Soil Ingestion - Residential, unless otherwise noted (see Appendix 10).

<sup>2</sup>M,P-Xylene and O-Xylene were analyzed by the laboratory. Total Xylenes are reported here for comparison to background. The breakdown of the individual xylenes are M,P-Xylene: 0.014 mg/Kg and O-Xylene: 0.002 mg/Kg. O-xylene is below the limit of quantitation.

Table 4-5-6 - SWMU 27 Analytical Results

Sample ID	Depth Interval (ft.)	Moisture Content (%)	Dry Unit Weight (lbs/ft <sup>3</sup> )	Permeability (cm/s)	Organic Content (%)	pH Soil/Solid	CEC (meq/100g)
GT27-1-1	0 - 2	3.9	114	2.48E-05	1.03	9.0	24.7
GT27-2-1	10 - 11	6.5	118.1	4.367E-08	0.93	8.9	27.0
GT27-6-1	40.5 - 41.5	3.9	114.4	1.90E-05	0.46	10.0	18.9
GT27-8-1	20 - 21	4.7	94.7	9.28E-05	0.67	9.2	18.5
GT27-9	0 - 2	4.2	111.1	1.25E-04	2.14	9.1	17.3

Table 4-5-7 – SWMU 27 Geotechnical Results

The results of the UXO field safety clearance tests were as follows:

Sample ID	Concentration	Remarks
SS27-CMS-1	< 0.5 PPM	(undetected)
SS27-CMS-2	< 0.5 PPM	(undetected)
SS27-CMS-3	> 5 PPM	

Table 4-5-8 – SWMU 27 UXO Clearance Results

For these samples, the D Tech Field Test Kit was configured for both RDX and TNT.

#### 4.5.7. Contaminant Characteristics

No analytes were found to be significantly above background concentrations, and no analytes were detected to be above the EPA Region III risk-based concentrations.

#### 4.5.8. Potential Receptor Identification

SWMU 27 is located in a remote area on a vast military installation in an arid desert. The area around this site is part of the Doña Ana Range Camp with only the small

range camp cantonment area being populated. Human access to the site and adjacent lands is restricted to military personnel working or residing at the McGregor Range Camp, other military personnel in the area during training exercises, civilians and military personnel engaged in hunting activities, and civilian contractors working on projects for the military. Since the SWMU is located on a military installation, it is assumed that public access is generally restricted; however, there are no physical barriers to prevent unauthorized personnel from entering this area, and Range Camp personnel report that such unauthorized entry is not uncommon.

The scope and depth of information needed on the population of potential receptors and the relative risk to those receptors are directly related to whether contamination is confirmed, and at what concentration level it is confirmed, and the potential for exposure based on a developed model for the migration of such contamination. Unlike the McGregor and Orogrande Range Camps, the Doña Ana Range Camp is reported to access potable groundwater (see following paragraph) indicating the need for a thorough evaluation of the possible impacts on this groundwater resource of any contamination originating from the landfill.<sup>65</sup> According to the Workplan for this RFI, if it is determined that contaminants exist at this site at levels that exceed EPA Region 3 Risk-Based Concentrations (RBCs) at a statistically significant level of confidence, then a baseline qualitative Human Health Risk Assessment (HHRA) will be performed at this site. This HHRA would be performed utilizing guidance as provided by the EPA documents *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)*<sup>66</sup> and *Risk Assessment Guidance for Superfund, Volume I :*

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<sup>65</sup> Ibid., A.T. Kearney, Inc.

<sup>66</sup> USEPA Office of Solid Waste and Emergency Response, Toxics Integration, Branch Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A), EPA/540/1-89/002, Washington, DC, 1989.

*Human Health Evaluation Manual Supplemental Guidance.*<sup>67</sup> None of the samples collected from SWMU 27 exhibited levels of contamination equal to, or greater than, the relevant RBCs. Therefore, no HHRA has been, or is scheduled to be, performed at this time.

The Fort Bliss Directorate of Public Works reports that two potable water production wells are currently serving the Doña Ana Range Camp. One well is located at the northwestern end of the Range Camp cantonment area. This well, identified as Well No. 3, is reported to have been completed in the mid-to-late nineteen-sixties and currently produces a flowrate of approximately 230 gpm. The second well is located approximately one-half mile northeast of the cantonment area. This well was completed in 1991 and currently produces a flowrate of 500 gpm. Both wells are connected to the water supply grid that provides potable water to the Range Camp. The approximate depth to water level is 380 feet for both of these wells. The quality of the groundwater tapped by these wells is reported to be high with TDS measured in the range of 300 to 350 ppm. A review of topographic maps of this area suggests that both of these wells may be situated upgradient of SWMU 27 as evidenced by surface elevation. However, it should be noted that surface elevation is not necessarily an accurate indicator of groundwater gradients, particularly if the source of the groundwater is a confined aquifer. Further information on these two wells may be obtained by contacting Mr. Bill Lewis at the Main Water Plant, Building 1318, Fort Bliss, Texas.

Another aspect of risk assessment is an ecological risk assessment, which in many ways is more complex than a HHRA. This is due, in large part, to the need to evaluate multiple species, the level of ecological structure to be considered (species, populations, ecosystems, etc.), and the less well-established bench marks for chronic

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<sup>67</sup> USEPA Office of Solid Waste and Emergency Response, Toxics Integration Branch, Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual Supplemental Guidance, OSWER Directive 9285:6-03, Washington, DC, 1991.

toxicity, etc. The process for conducting a screening-level ecological risk assessment (SERA) was discussed in the Workplan for this RFI and will not be repeated here.<sup>68</sup> No visible signs of stressed vegetation were apparent at the site. By the nature of the activities that have taken place at this site, the surface area where the waste trenches were constructed has been impacted, and the appearance is markedly different from the surrounding undisturbed area. The disturbed area is revegetating, although large areas of the site remain sparsely covered. There are no surface water bodies in the vicinity of SWMU 27.

At this stage in the RFI process, based on a qualitative review of the types, concentrations and locations of contaminants detected at this site, the additional expense that would be experienced by conducting an extensive risk assessment is not warranted.

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<sup>68</sup> USEPA Risk Assessment Forum (February), Framework for Ecological Risk Assessment, EPA/630/R-92/001, Washington, DC, 1992.



#### 4.6. SWMU 29-Doña Ana Range Sanitary Landfill

Solid Waste Management Unit (SWMU) 29 is known as the Doña Ana Range Sanitary Landfill. This site has also been identified as Landfill No. 11 (FTBL-011). The landfill is located immediately southwest of the Doña Ana Range Camp. The Range Camp is located on the Fort Bliss Military Reservation which covers approximately 1.2 million acres of land in New Mexico and Texas near El Paso, Texas.<sup>69</sup> The site is located in the New Mexico portion of the Fort Bliss Military Reservation within the Hueco Basin of the New Mexico Highland section of the Basin and Range province approximately 25 miles north of El Paso.<sup>70</sup> An Aerial Photograph (Figure 4-6-1) of the site is located on the following page.

The Site Location Map (Figure 4-6-2) shows the Doña Ana Range Camp area, the location of SWMU 29 and the other SWMUs in this area, and is located following the Aerial Site View.

##### 4.6.1. Unit Description and Characteristics

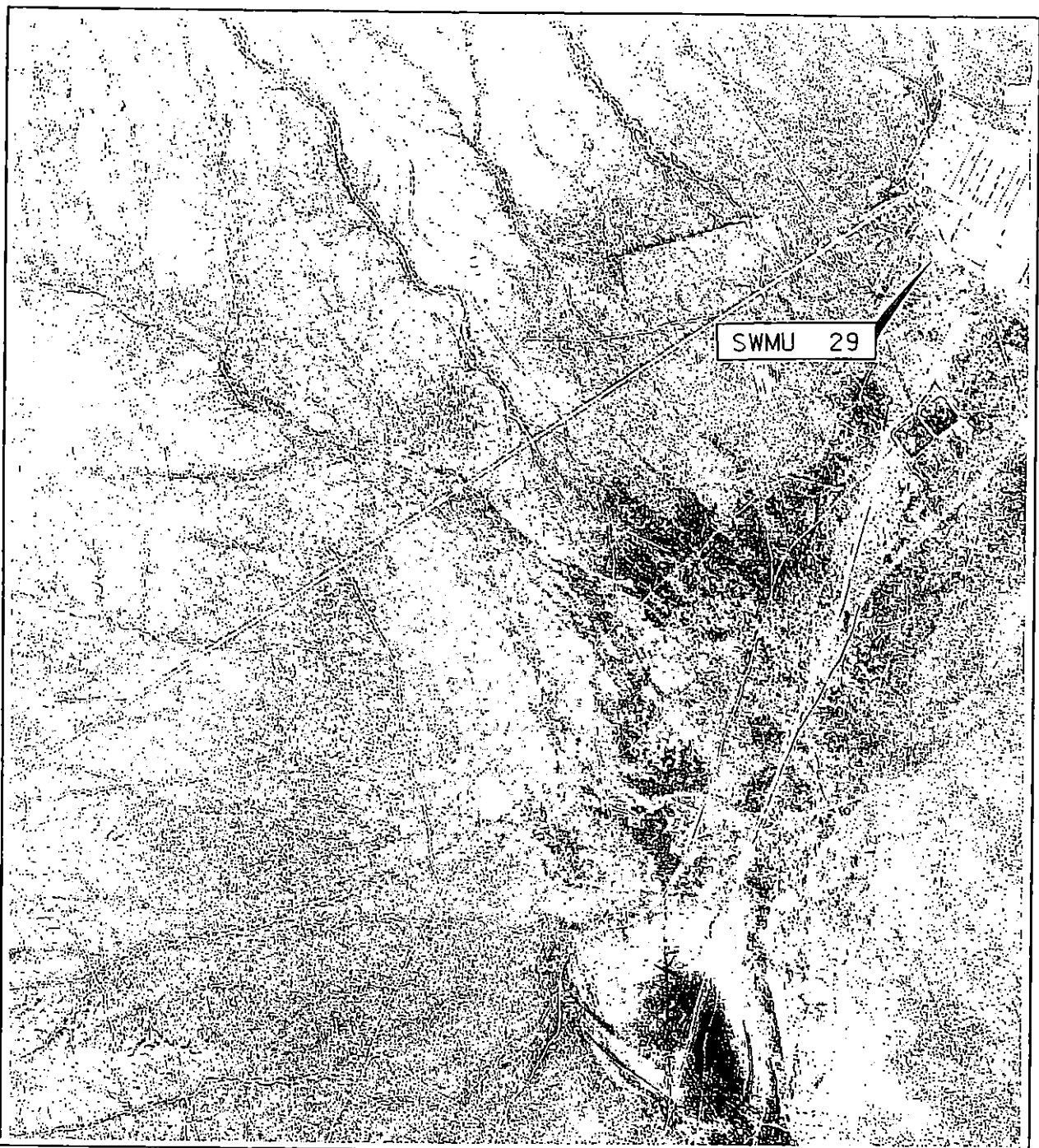
SWMU 29 is reported to be a trench-type landfill, underlain and covered with soil. The specific topography of the site is depicted on the SWMU 29 Site Plan (Figure 4-6-3) located on the following pages. At the initiation of Workplan development for this RFI, the exact location of this site was not known. The RFA report by Kearney, the USAEHA Final Report,<sup>71</sup> and the USACE Contract Document all contain a similar description of the site. The landfill is reported to encompass an area of about 5 acres and to have been operated by Fort Bliss from prior to World War II to 1945. No

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<sup>69</sup> A.T. Kearney, Inc., RCRA Facility Assessment PR/VSI Report: U.S. Army Air Defense Artillery Center and Fort Bliss, Texas, Prepared for the U.S. Environmental Protection Agency, Chicago, IL, 1989.

<sup>70</sup> Section 2, Environmental Setting for a general overview of the geology and hydrogeology in this area.

<sup>71</sup> U.S. Army Environmental Hygiene Agency, Final Report, Hazardous Waste Consultation No. 38-26-1647-90, Evaluation of Solid Waste Management Units, Fort Bliss, Texas, August 3-7, 1987 & September 26-29, 1989.



# DONA ANA AREA SANITARY LANDFILL

DATE OF PHOTOGRAPH

12-01-85

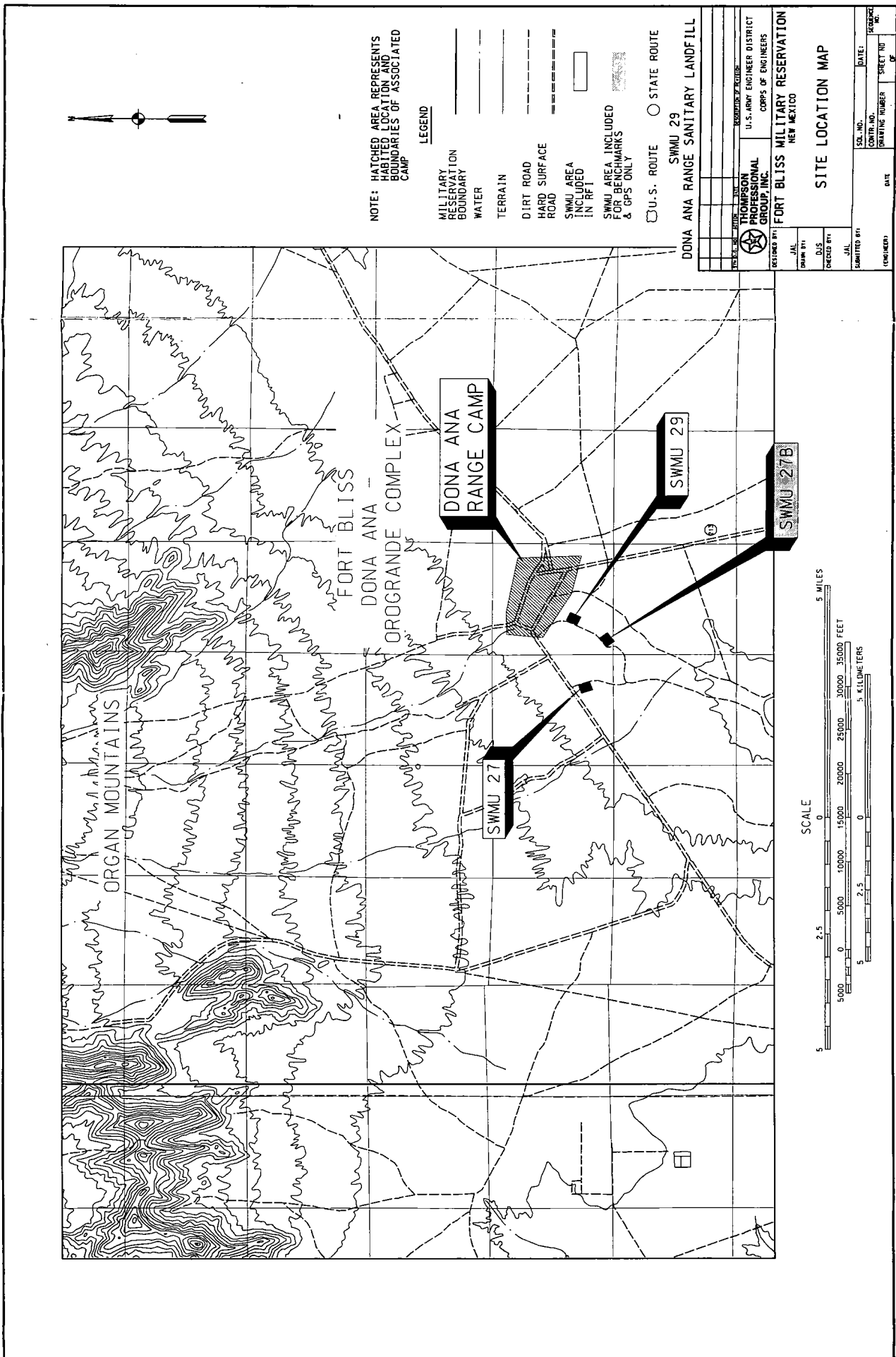
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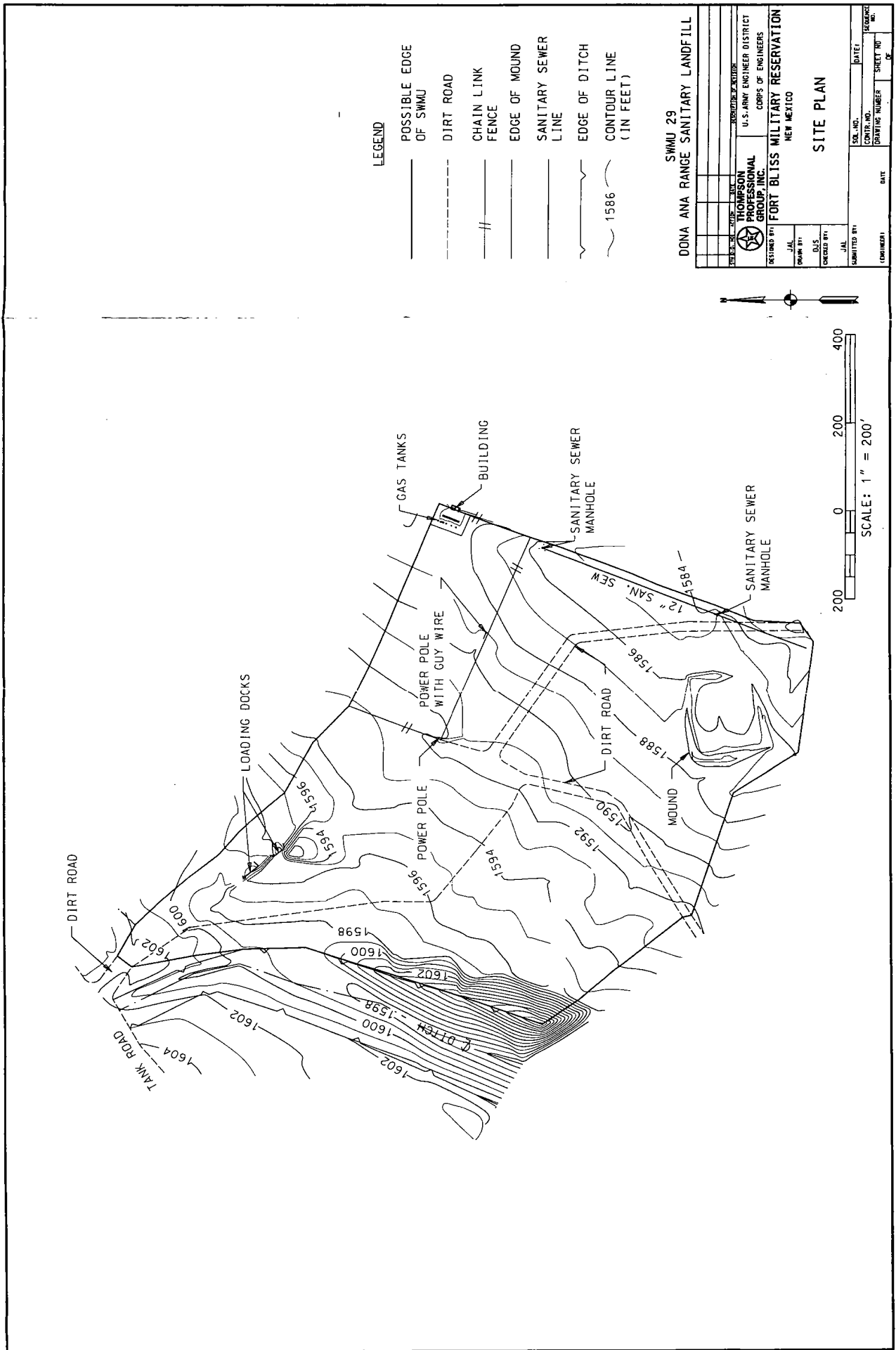
AERIAL PHOTOGRAPHY COURTESY OF FORT BLISS  
DEPARTMENT OF PUBLIC WORKS



SYN. NO.		ACTION		DATE		DESCRIPTION OF REVISION	
		<b>THOMPSON PROFESSIONAL GROUP, INC.</b>		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS			
DESIGNED BY:		FORT BLISS MILITARY RESERVATION					
DRAWN BY:		NEW MEXICO					
CHECKED BY:		DONA ANA RANGE CAMP AERIAL SITE VIEW					
SUBMITTED BY:		SOL. NO.		DATE:		SEQUENCE NO.	
(ENGINEER)		CONTR. NO.		DRAWING NUMBER		SHEET NO. OF	

Figure 4-6-1  
Section 4 – Page 108





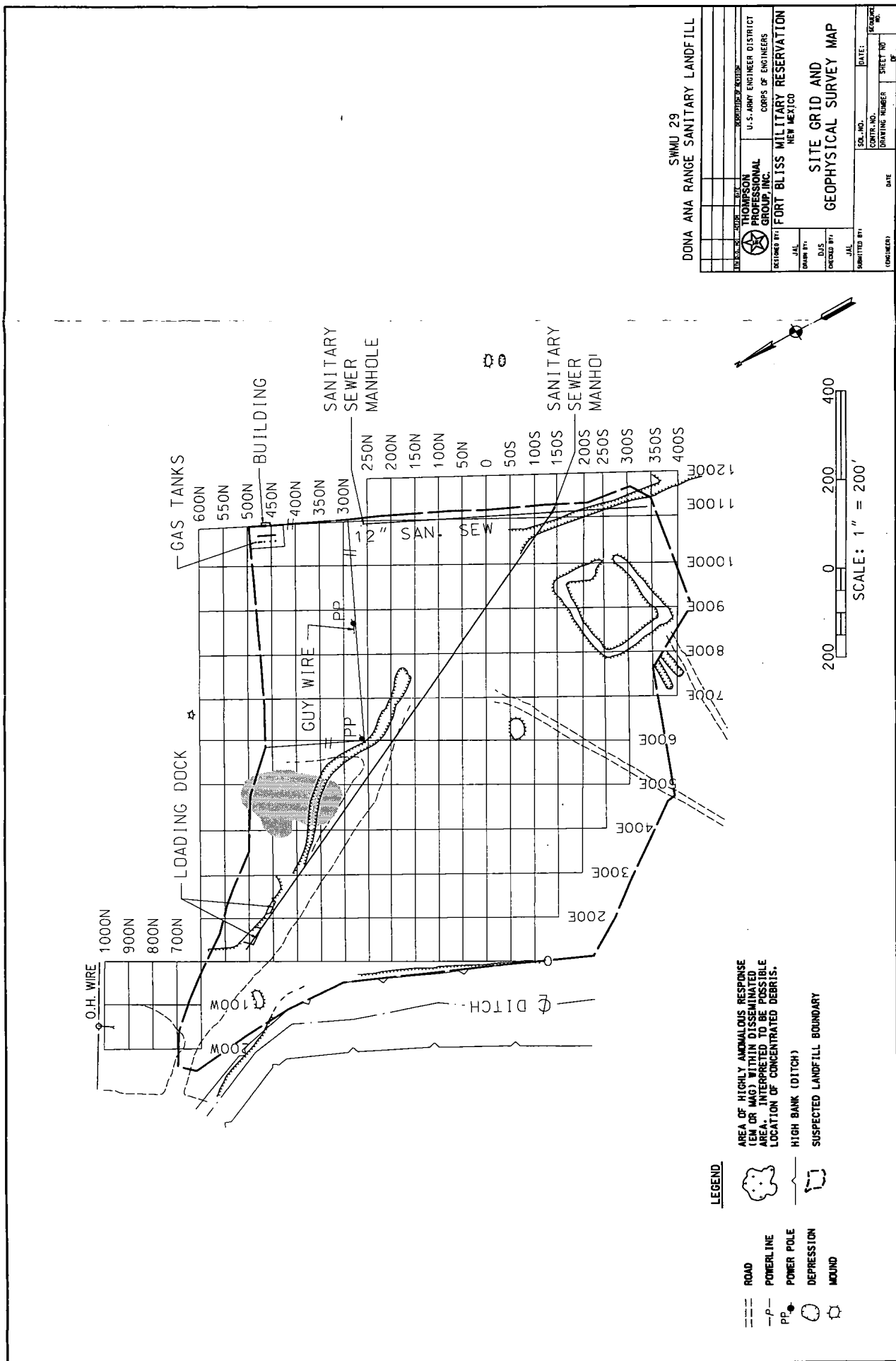
**LEGEND**

- POSSIBLE EDGE OF SWMU
- - - DIRT ROAD
- == CHAIN LINK FENCE
- EDGE OF MOUND
- SANITARY SEWER LINE
- EDGE OF DITCH
- 1586 CONTOUR LINE (IN FEET)

**SWMU 29**  
**DONA ANA RANGE SANITARY LANDFILL**

<b>THOMPSON PROFESSIONAL GROUP, INC.</b> U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS FORT BLISS MILITARY RESERVATION NEW MEXICO		<b>SITE PLAN</b>	
DESIGNED BY JAL	DRAWN BY JUS	CHECKED BY JAL	SUBMITTED BY JAL
DATE 10 APR 97	DATE 08-15-18	DATE 08-15-18	DATE 08-15-18
SHEET NO. 1		SHEET NO. 1	

**FIGURE 4-6-3**  
**Section 4 – Page 110**



#### 4.6.5.3. Soil Gas Survey

Utilizing the results of the geophysical survey, a soil gas sampling survey was conducted to delineate zones of VOC contamination. Soil gas sampling was conducted at 3 points at SWMU 29. Sampling locations exhibiting relatively high VOC concentrations, as indicated by the PID instrument, were given priority when selecting locations for soil boring. Gas samples were submitted for chemical laboratory analysis when the PID screen registered VOC concentrations greater than 10 ppm. The results of samples submitted for chemical laboratory analyses are included in Appendix 11 of this Report. Table 4-6-2, included following this discussion, lists the sample grid locations and the results of the field PID screening. A complete record of each soil gas sampling event is included in Appendix 7. The methodology and equipment used to perform this survey are discussed in Section 3 of this Report. The locations of the soil gas sampling points are depicted on the Site Sampling Location Map (Figures 4-6-5 A and B) which is included in Subsection 4.6.6.

Sample Number	Grid Location	PID Reading (ppm)	Laboratory Sample Taken?
SG29-1	425N/375E	0.0	N
SG29-2	3580N/375E	2.2	N
SG29-3	475N/375E	0.0	N

Table 4-6-2 – SWMU 29 Soil Gas Sampling Results

#### 4.6.5.4. Trench Excavation

An observation pit was excavated into the waste mass at a single trench location in order to examine the waste contents and to confirm data gathered during the geophysical survey concerning the depth of the trench and the thickness of the trench cover. The choice of location for this excavation was based on information generated during the geophysical survey and from the PID screening data resulting from the soil gas survey. The trench was excavated at

the only buried waste mass detected by the geophysical survey (refer to the Site Sampling Location Map, Figures 4-6-5 A and B, to reference the location of the observation trench). The methodology employed to excavate and examine the trench is included in Section 3 of this Report. The data gathered during the trench excavation provides the basis for Subsection 4.6.6.2., Waste Characterization.

#### 4.6.5.5. Soil Boring and Sampling

No soil boring was conducted at this site. Borings were reallocated to other SWMUs being investigated as part of this RFI.

Sample Type	Number of Samples	VOC	SVOC	PCB/ Pest.	Metals	TPH	Methane <sup>1</sup> (as LEL)	Carbon Monoxide <sup>1</sup>	Oxygen <sup>1</sup> (as O <sub>2</sub> )	Hydrogen Sulfide <sup>1</sup>
Soil Surface Borings										
Rinsate										
Split										
Soil Gas		X <sup>1</sup>					X	X	X	X

<sup>1</sup> Field tested

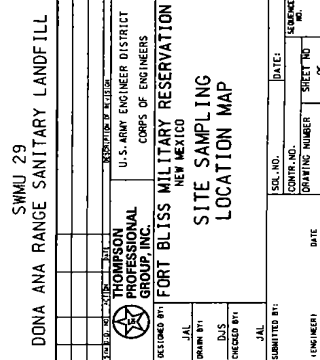
Table 4-6-3 – SWMU 29 Actual Number of Samples and Parameters

#### 4.6.6. Results of Investigation-Findings

The following discussion presents the pertinent findings of the investigative activities conducted at SWMU 29.

##### 4.6.6.1. Unit Characterization

Based on the results of the geophysical survey, and supported by data from the trench excavation, SWMU 25 appears to consist of a single rubble pit. The Site Grid and Geophysical Survey Map, included earlier, displays the results of the geophysical survey in plan view. A detailed discussion of the geophysical



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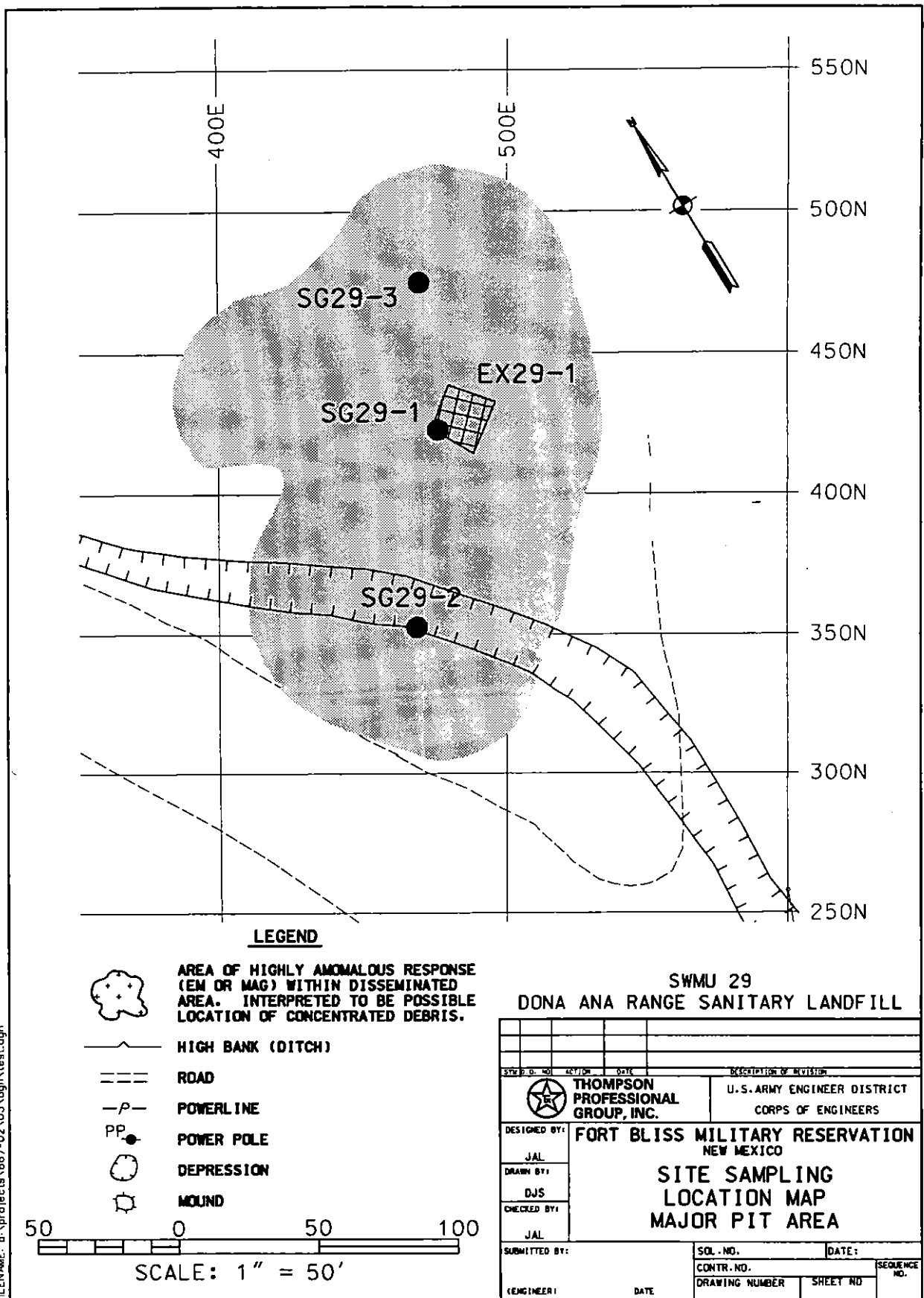


Figure 4-6-5 B  
 Section 4 - Page 120

survey conducted at this site along with additional supporting maps is included in the Final Report produced by Golder Associates and included as Appendix 2 to this Report.

The single rubble pit, located at grid reference 430N/380E, appears to be approximately 60 feet in diameter. As explained in the geophysical report, the effort to establish the depths of the waste units was frustrated by poor penetration of the GPR signal and interference from debris within these units. The depth of penetration of the GPR signals is partially dependent on the electrical properties of the soils. This depth may be significantly inhibited in soils containing fine grained sediments such as silts and clays. As a result, GPR was only able to reflect the minimum unit depths along the transects where the GPR was deployed. With this clarification, the minimum detected depth of the rubble pit was 6 feet. The actual depth of the unit encountered during excavation at the location designated EX29-1 on the Site Sampling Location Map, Figures 4-6-5 A and B, was approximately 4 feet (see Table 4-6-4 in the following Subsection).

The detected thickness of the rubble pit cover, as measured by GPR, was 2 feet to 2.5 feet along the transects where GPR was deployed. When this pit was excavated to inspect the waste, the thickness of the cover was observed to be approximately 6 inches thick directly above the waste.

There were no other buried waste units detected at this site. Approximately 25 acres were surveyed during the geophysical investigation at SWMU 29.

#### 4.6.6.2. Waste Characterization

Data on waste characterization for SWMU 29 was derived from the trench excavation. The location of the excavation, identified as EX29-1, may be

referenced on the Site Sampling Location Map (Figures 4-6-5 A and B). The results of the excavation are presented in tabular form as follows:

Depth Interval (ft.)	Waste Description
0 - 0.5	Pit cover: densely compacted silty, clayey sand, tan
0.5 - 4	Metal strapping, metal locker w/shelving, expended smoke grenade, concrete rubble, plastic sheeting, communications wire, glass bottle, coffee can, metal sheeting

Table 4-6-4 – SWMU 29 Waste Trench Excavation

At the conclusion of the excavation, it appeared that all of the contents of the pit had been removed to the surface and cataloged. There was no apparent reason to extend the excavation deeper than indicated in Table 4-6-4.

#### 4.6.6.3. Sampling Results

At the completion of the rubble pit excavation, Fort Bliss was contacted to discuss the implications of the results of the geophysical survey and rubble pit excavation for the planned site investigation of SWMU 29. The Fort Bliss Directorate of Environment and Thompson Professional Group, Inc. agreed that further investigative efforts at this site, based on the results achieved to this point, were unwarranted. Therefore, the soil boring program was eliminated and the investigative resources represented by these borings were shifted to other sites included in this RFI.

#### 4.6.7. Contaminant Characteristics

No soil samples were collected at this site.

#### 4.6.8. Potential Receptor Identification

No sources of contamination were identified at this site.



## **5. SUMMARY AND CONCLUSIONS**

### **5.1. General Comments**

During the development of the RFI Workplan and the performance of the site investigation, the potential for contamination was considered in the following media: groundwater, surface water and sediments, air, soil, and subsurface gases. With the exception of potential soil contamination at the sites which is discussed in the site-specific summaries, the other media may be addressed in common as follows:

- Groundwater was not encountered during the course of soil boring; therefore, no monitoring wells were installed and no groundwater samples were collected.
- There were no surface waters in the vicinity of the sites; therefore, no surface water or sediment samples were collected.
- Air contamination from the volatilization of wastes, or decomposition by-products of wastes buried in trenches at the sites, was not considered to be a potential problem; however, air monitoring for site safety was conducted throughout the investigation with no traces of volatile contaminants being detected.
- Subsurface gases were sampled at all four rubble pit landfill sites, and all soil boring core samples were scanned with a PID monitor. The results of the soil gas sampling were presented in the discussions of the individual SWMU investigations. The results of the soil boring PID screenings are included in the soil boring logs in Appendix 3. None of the subsurface gases sampled tested at a significant level for contamination.
- Furthermore, there was no visual evidence of contamination such as distressed vegetation or discolored soil noted at any of the sites. There was no evidence of odors emanating from the exposed waste units during excavation, except as noted at SWMU 18.

Groundwater in the vicinity of the Range Camps is reported to lie at a depth of at least 300 feet beneath the surface. The groundwater beneath the McGregor Range Camp and the Orogrande Range Camp is considered to be unfit as a potable supply. The groundwater beneath the Doña Ana Range Camp is reported to be currently used as a drinking water source. Therefore, the potential impact on groundwater of any significant release of contamination from the waste units at SWMU 27 must be addressed in terms of potential human receptors.

Even though the waste units examined at SWMUs 18, 25, and 27 could be considered to be likely sources of contaminant releases due to the lack of liners, little evidence of such releases was detected, possibly due to the fact that the relatively low levels of precipitation experienced in this area result in low levels of infiltration resulting in a correspondingly low level of leachate production.

None of the samples exhibited significant exceedances of background levels for the inorganic parameters. However, the background data was applicable to the general area of the sites, and geochemical variations may be the cause of exceedances of the calculated background levels. None of the detected inorganic parameters exhibited concentrations exceeding EPA Region 3 Residential Risk-Based Concentrations (RBCs). Additionally, of the detected organic parameters, no exceedances of the RBCs were observed.

Refer to Table 5-7-1, Subsection 5.7, for a site-specific, tabular summary of the RFI.

## 5.2. SWMU 18 - McGregor Range Rubble Pit/Landfill

At the time of this investigation, SWMU 18 was observed to be slowly revegetating with native plants. One soil sample taken during this investigation exhibited contaminant concentrations significantly above background levels. Sample SB18-7-7 had a toluene concentration of 0.150 mg/kg. This sample was collected at a 50-foot depth from an angle boring, directly beneath a waste trench, and may indicate a vertical contaminant plume leaching from the waste trench. None of the other samples collected in this investigation exhibited detections for other parameters significantly above background levels.

The results of the geotechnical analysis show the permeability ( $1.47\text{E-}5$  cm/s) of the trench covers to be of the same magnitude as the NMED required permeability ( $1\text{E-}5$ ). However, the trench cover is less permeable than the native topsoil adjacent to the trenches. Ponding of run-on and subsequent infiltration are possible at any subsided areas.

Finally, of the rubble found on the surface of SWMU 18, a small area of discarded floor tile was noted. The floor tile was 9 inches by 9 inches, dark maroon, with black mastic on what was the underside of the tiles. Sizes of the tile ranged from 2-inch x 2-inch fragments to entire tiles, but did not appear to be significantly weathered. The location of the tile was at approximately 66N and 790W, and covered an area of approximately 4 feet x 6 feet at the base of a dirt mound. Some of the tile was partially buried beneath the dirt mound. Personnel with knowledge of asbestos determined that the tile appears to be similar to tile that is known to contain asbestos. The tile was not covered with dirt or encapsulated in any manner.

#### 5.3. SWMU 20 - McGregor Range Open Detonation Area

Two detonation pits were identified. The surface area surrounding the main pit is littered with the debris from exploded missiles and abandoned metal drums. One soil sample taken during this investigation exhibited an Arochlor-1254 concentration significantly above background levels. Sample SS20-6 had an Arochlor-1254 concentration of 0.81 mg/kg, but less than the RBC of 1.6 mg/kg. None of the other samples collected at this site during this investigation exhibited contaminant detections significantly above background levels or RBCs.

Explosives residue may have been detected at a high concentration in a UXO field clearance sample collected at the minor detonation pit.

#### 5.4. SWMU 25 - Orogrande Range Rubble Pit/Landfill

At the time of this investigation SWMU 25 appeared to be slowly revegetating. No samples collected during this investigation exhibited contaminant detections above background levels.

The gully west of the site that contains the tar material was investigated. No distressed vegetation was observed and sampling results did not indicate contamination in the native soils immediately adjacent to the tar. The tar has become solidified in the gully bed.

The results of the geotechnical laboratory analyses of the trench cover show the permeability ( $7.63\text{E-}7$  cm/s) of the soil layer to be less permeable than the NMED required permeability ( $1\text{E-}5$ ). Additionally, the trench cover is less permeable than the native topsoil adjacent to the trench.

The waste trench cover soils appear to have undergone substantial subsidence, and are distinguishably lower in elevation than the surrounding terrain. Depressions and subsidence cracks were noted in the trench cover. The potential for surface erosion appears to be low. Ponding of run-on and subsequent infiltration are likely at the subsided area.

#### 5.5. SWMU 27 – Doña Ana Range Rubble Pit/ Landfill

At the time of this investigation SWMU 27 appeared to be slowly revegetating. None of the samples collected at this site exhibited contaminant concentrations significantly above background levels or RBCs. One soil sample collected at a depth of from 5 to 7 feet tested positive for xylene at a concentration of approximately 3 times background.

The results of the geotechnical laboratory analyses of the trench cover show the permeability ( $1.35\text{E-}4$  cm/s) of the soil layer to be more permeable than the NMED required permeability ( $1\text{E-}5$ ). Additionally, the trench cover is more permeable than the native topsoil adjacent to the trenches.

There is evidence of erosion in the northeast area of the SWMU, and it has been determined that the potential for future erosion is high based on the proximity of the SWMU to the Organ Mountains and obvious current erosion. Additionally, there are depressions and subsidence cracks noted in some of the waste trench covers. Ponding of run-on and subsequent infiltration are likely at the subsided area.

## 5.6. SWMU 29 – Doña Ana Range Sanitary Landfill

At the time of this investigation the area containing SWMU 29 was a staging area for large vehicles. The geophysical survey and the trenching excavation indicated that SWMU 29 may never have existed at the location examined, or if it did exist, was not composed of buried waste pits and/or trenches. The material examined at the pit excavation did not appear to be related to the era when SWMU 29 was reported to have been active.

## 5.7. RFI Summary Table

INVESTIGATION OBJECTIVE	SITE				
	SWMU 18	SWMU 20	SWMU 25	SWMU 27	SWMU 29
Unit Characterization:					
Location Confirmed	Yes	Yes	Yes	Yes	No
Area Delineated	Yes	Yes	Yes	Yes	NA
Depth Determined	Partial	NA	Partial	Partial	NA
Waste Characterization	Yes	Yes	Yes	Yes	Yes
Geotechnical Characterization:					
Trench Cover	Yes	NA	Yes	Yes	NA
Native Soil	Yes	Yes	Yes	Yes	NA
Survey/Mapping:					
Bench Marks	Yes	Yes	Yes	Yes	Yes
Sampling Points	Yes	Yes	Yes	Yes	Yes
Coordinates	Yes	Yes	Yes	Yes	Yes
Release Detection:					
Contamination Detected	Yes	Yes	No	Yes	NA
Exceeds RBC	No	No	No	No	NA
Extent Delineated	No	No	NA	No	NA
Erosion Potential	Low	NA	Medium	High	NA
Risk to Potential Receptors	Low	Low	None	Low	NA

Table 5-7-1 – RFI Summary

## 6. Recommendations

## **6. RECOMMENDATIONS**

Based on the findings of this investigation, Thompson Professional Group, Inc. recommends the following:

- Based on the evidence of waste unit cover subsidence observed during the course of the investigation at SWMUs 18, 25, and 27, Thompson recommends that corrective measures to ameliorate those conditions be addressed.
- Based on the evidence of erosion observed during the course of the investigation at SWMU 27, Thompson recommends that corrective measures to ameliorate those conditions be addressed.
- Based on the analytical result of 0.810 mg/kg for Aroclor 1254 reported for the surface sample collected at SS20-6 at SWMU 20, Thompson recommends that three additional surface samples be collected from the immediate vicinity of SS20-6, and that these samples be analyzed for Aroclor 1254 in order to delineate the areal extent and concentration of this contaminant. Although the detected concentration of Aroclor 1254 did not exceed the EPA Region 3 RBC for this constituent, the detected concentration is of the same magnitude as the RBC. Three additional samples could provide confirmation of this location as a contaminant "hot spot" or could provide evidence that the sample result from SS20-6 was an aberration.
- Based on the results of the UXO field clearance sample (SS20-CMS-4) tested at the minor detonation pit at SWMU 20, Thompson recommends that three additional surface soil samples be collected from the immediate vicinity of the field test. These three samples should be analyzed for explosives to confirm the results of the field test or to eliminate the suspicion of explosives contamination at this location.



**Explosives Site Plan**  
**Remedial Investigation/Feasibility Study**  
**for Area of Interest North of Castner Range**  
**El Paso, Texas**

**Contract Number: W912DY-10-D-0027 – Delivery Order: DS01**

**October 2017**

**Version: Final, Revision 3**

*Prepared for*

**U.S. Army Corps of Engineers, Tulsa District**  
**CECT-SWT-E**  
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*Prepared by*

**KEMRON Environmental Services, Inc.**  
**1359A Ellsworth Industrial Blvd.**  
**Atlanta, GA 30318**  
**404-636-0928**

<b>1. SITE .....</b>	<b>1-1</b>
1.1. NAME.....	1-1
1.2. STATE .....	1-1
<b>2. ANTICIPATED START DATE .....</b>	<b>2-1</b>
<b>3. PURPOSE.....</b>	<b>3-1</b>
<b>4. SITE BACKGROUND AND CURRENT CONDITIONS .....</b>	<b>4-1</b>
<b>5. EXECUTING AGENCIES .....</b>	<b>5-1</b>
<b>6. SCOPE OF INVESTIGATIVE/CHARACTERIZATION ACTION .....</b>	<b>6-1</b>
<b>7. SAFETY CRITERIA.....</b>	<b>7-1</b>
<b>8. METHODS OF DISPOSAL.....</b>	<b>8-1</b>

**LIST OF TABLES**

Table 6-1	MRS Area
Table 7-1	Minimum Separation Distances

**LIST OF APPENDICES**

Appendix A	Maps
Appendix B	Fragmentation Data Review Form

**Acronym List**

AEC	Army Environmental Command
AOI	area of interest
DDESB	Department of Defense Explosives Safety
DGM	digital geophysical mapping
DoD	U.S. Department of Defense
EM	engineer manual
EPA	U.S. Environmental Protection Agency
ESQD	explosive safety quantity-distance
FS	feasibility study
HE	high energy
HFD	hazard fragment distance
KEMRON	KEMRON Environmental Services, Inc.
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
MRS	Munitions Response Site
MSD	minimum separation distance
RI/FS	remedial investigation/feasibility study
SUXOS	Senior UXO Supervisor
TCEQ	The Texas Commission on Environmental Quality
TM	technical manual
TP	technical paper
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance

## 1. SITE

---

### 1.1. Name

Area of Interest North of Castner Range, El Paso, Texas.

### 1.2. State

Texas.

## 2. ANTICIPATED START DATE

---

October 2017.

### **3. PURPOSE**

---

U.S. Army Corps of Engineers (USACE) is conducting environmental activities at the Munitions Response Site (MRS) known as the Area of Interest (AOI) North of Castner Range, El Paso, Texas, site under the Defense Environmental Restoration Program-Military Munitions Response Program. KEMRON Environmental Services, Inc. (KEMRON) will perform all work in accordance with federal, state, and local statutes, regulations, and guidance. The Texas Commission on Environmental Quality (TCEQ) and U.S. Environmental Protection Agency (EPA) Region 6 are the regulatory agencies for this site. TCEQ is the lead regulatory agency. As such, all associated work will be consistent with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986, and National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations §300) requirements, and under the state of Texas Voluntary Cleanup Program with regulatory coordination, as appropriate, by TCEQ. The AOI North of Castner Range is not on the National Priorities List.

## **4. SITE BACKGROUND AND CURRENT CONDITIONS**

---

The AOI North of Castner Range is 7,936 acres in El Paso County, Texas. The remedial investigation area will include approximately 5,860 acres. It is located north of the Closed Castner Range, now owned by the state of Texas and the city of El Paso, and is bounded by Martin Luther King Boulevard on the east and Franklin Mountains State Park on the west. Housing developments exist to the south, and a quarry is in operation just north of the northern boundary. The site location is shown in **Appendix A, Figure 1**.

There are no records showing ownership or use of the AOI by Fort Bliss; however, multiple munitions debris (MD) items were identified during a munitions and explosives of concern (MEC) reconnaissance survey completed by USACE, Huntsville District, from 2013 to 2015. The Army Environmental Command indicated that the presence of MD occurred either from kick-out debris from an open burn/open detonation area or from overshoot during training exercises in the Fort Bliss Closed Castner Range that borders the AOI. No MEC items were discovered during the reconnaissance.

Current land uses at the AOI North of Castner Range include ranching and state park land. The area is currently owned by the state of Texas (Franklin Mountains State Park) and the city of El Paso, Texas.

## **5. EXECUTING AGENCIES**

---

- Fort Bliss
- Army Environmental Command
- USACE Tulsa District
- TCEQ
- EPA Region 6

## 6. SCOPE OF INVESTIGATIVE/CHARACTERIZATION ACTION

The current project involves an RI/FS and achieving stakeholder acceptance of a Proposed Plan and Decision Document for the 5,860-acre AOI North of Castner Range in El Paso County, Texas. The objective of the RI is to build on previous work and includes collecting appropriate data to characterize the nature and extent of MEC and munitions constituents (MC) at the site.

A combination of digital geophysical mapping (DGM), analog mag and dig, and visual-aided survey will be conducted to determine the extent of MEC contamination within the MRS for the RI/FS, shown in **Table 6-1** and further detailed in **Appendix A, Figure 2**. All anomalies will be intrusively investigated to the depth of detection of the Geonics EM61-MK2 metal detector or handheld EM sensor being used. KEMRON unexploded ordnance (UXO) technicians will provide MEC anomaly avoidance during the DGM and visual-aided surveys. The UXO team under the supervision of the Senior UXO Supervisor (SUXOS) will conduct manual intrusive investigations of the identified anomalies.

All KEMRON personnel assigned to the RI/FS project will meet the minimum qualifications outlined in Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP) 18.

**Table 6-1**  
**MRS Area**

<b>MRS</b>	<b>Munitions Response</b>	<b>Acreage</b>
AOI North of Castner Range	RI/FS	5,860

## 7. SAFETY CRITERIA

In February and June 2013, the Ordnance and Explosives (OE) Directorate Corps of Engineers Huntsville Center (CEHNC) conducted a Munitions and Explosives of Concern (MEC) reconnaissance survey on the former North Castner Range (NCR) footprint. During this survey, no explosive hazards were observed, but several 75mm MK1 (shrapnel) projectile casings were identified. Based on these findings, the munition with the greatest fragmentation distance for the AOI North of Castner Range MRS is the 75mm Mk1 (shrapnel) projectile. If MEC with a greater fragmentation distance is encountered within the AOI North of Castner Range, the minimum separation distance (MSD) will be adjusted in accordance with DDESB TP 16, operations will continue, and an amendment to this Explosives Site Plan will be submitted for approval. A copy of this document will be available on site. The explosive safety quantity-distance (ESQD) arcs will be adjusted accordingly. All intrusive operations carried out during this project will follow procedures outlined in site Work Plans, SOPs and Engineer Manual (EM) 385-1-97, Explosives - Safety and Health Requirements Manual, as well as Department of the Army Pamphlet (DA-PAM) 385-64, Ammunition and Explosives Safety Standards.

Fragmentation Data Review Forms are in **Appendix B; Table 7-1** and **Appendix A, Figure 2** contain information related to MSDs.

**Table 7-1  
Minimum Separation Distances**

MRS	MEC	MSD (feet)				
		Unintentional Detonations		Intentional Detonations		
		Team Separation Distance (K40)	Hazard Fragment Distance (HFD)	Without Engineering Controls	Using Single Sandbag Mitigation	Using Double Sandbag Mitigation
AOI North of Castner Range	75mm Mk1 (shrapnel) projectile	17	121	886	25	12.5

Any occupied building or public roadway in the MSD area will be evacuated and/or blocked to prevent non-essential personnel from entering during MEC operations.

## 8. METHODS OF DISPOSAL

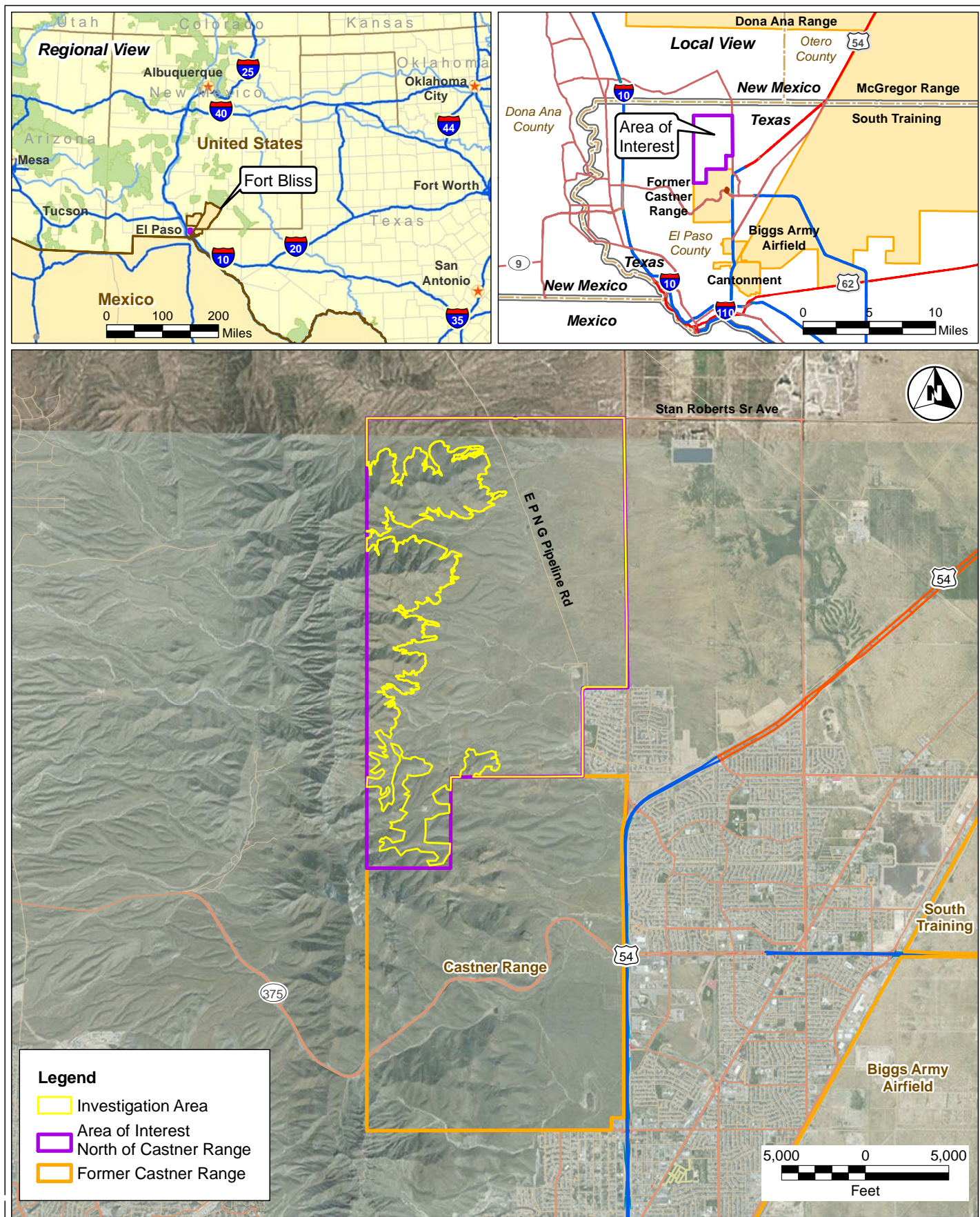
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- a. All recovered MEC deemed by the KEMRON SUXOS and the UXO Safety Officer jointly as “acceptable-to-move” may be relocated within the AOI North of Castner Range, away from buildings and public transportation routes as necessary for disposal. In areas where multiple MEC items are found, collection points may be used. Collection points are those areas used to temporarily accumulate MEC determined acceptable to move by the SUXOS and UXOSO pending destruction at the end of the day using consolidated shots. MEC items at collection points must be laid out as shown in “Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites.” The maximum net explosive weight (NEW) at a collection point will be limited such that the K40 overpressure distance for the total NEW does not exceed the HFD for the area. Consolidating multiple MEC is anticipated for this project. If determined acceptable to move by the SUXOS and UXOSO consolidating multiple MEC may be anticipated for this project, US Army Engineering and Support Center, Huntsville (USAESCH) publication “Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites,” dated March 2000 will be used and a copy of this report will be available on site. The maximum NEW for a consolidated shot will be limited such that the K328 overpressure distance for the total NEW (including donor charges) does not exceed the MSD for the intentional detonation.
- b. All recovered MEC will be destroyed the same day found. In the event that MEC items cannot be disposed of on the same day the MEC will be guarded until disposal operations can be conducted.
- c. All explosive demolition operations will follow the procedures outlined in site Work Plans, SOPs and Engineer Manual (EM) 385-1-97, Explosives - Safety and Health Requirements Manual.
- d. Material potentially presenting an explosive hazard (MPPEH) procedures will be in accordance with U.S. Department of Defense (DoD), DoDI 4140.62, Material Potentially Presenting an Explosive Hazard (MPPEH) and USACE EM 200-1-15, Technical Guidance for Military Munitions Response Actions. All MPPEH will be assessed and its explosives safety status determined and documented before transfer within DoD or released from DoD control. Before release to the public, MPPEH will be documented by authorized and technically qualified personnel as material documented as safe after a 100% inspection and an independent 100% re-inspection to determine that it is safe from an explosives safety perspective.
- e. All demolition explosive materials for this project will be delivered to the project site by an Alcohol, Tobacco, Firearms and Explosives-licensed explosive dealer on an as-needed basis. No explosive storage is planned for this site.
- f. Sandbag mitigation may be used as engineering controls to reduce the intentional detonation MSD. These controls will be used IAW HNC-ED-CS- 98-7, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, August 1998, its Amendment 1, February 2011 and its Amendment 2, November 2014; CEHNC-EMM Memorandum, Safety Advisory: Use of Jet Perforator During Intentional Detonation While Using Sandbag Mitigation for Engineering Controls, 7 November 2011; and DDESB-PD memorandum of 22 May 2014, Subject: Revision of DDESB Approval for Use of Sandbags for Mitigation of Fragmentation and Blast Effects Resulting From Intentional Detonation of Munitions Single sandbag mitigation will be the preferred fragmentation mitigation during demolition operations, except for any demolition conducted on or within the investigation area boundary (**Appendix A, Figure 2**), along the section of Pipeline road that runs along the west side of the residential area. Here, double sandbag mitigation will be utilized.

- g. Should MEC be identified within the HFD of any public access road during intrusive operations, physical barriers coupled with road guards will be used to block traffic until the operation is complete.
- h. Fliers, social media, and existing Web-based community notification processes will be used to inform nearby residents of planned operations. Any residents affected by ESQD arcs as outlined in this Explosives Site Plan will be notified 24 hours in advance of intrusive operations.
- i. Chemical Warfare Materials (CWM) have not been identified at the Area of Interest North of Castner Range, and is not anticipated to be encountered during these activities. Should CWM be encountered, all personnel will evacuate the area, noting its location, and contact the SUXOS and UXOSO, who will notify the OESS, implementing the necessary response procedures outline by the USACE.

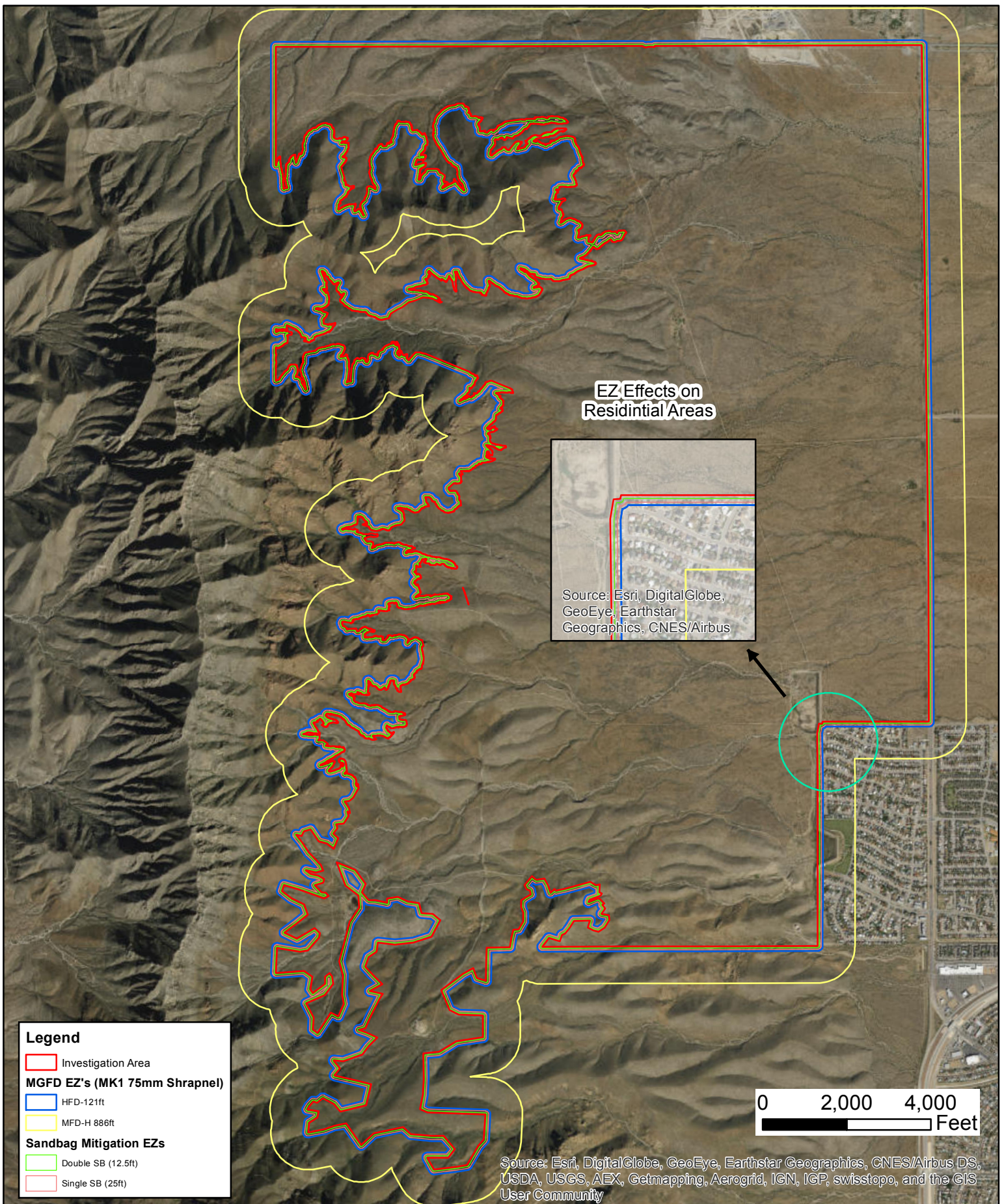
## **APPENDIX A**

### **MAPS**



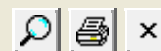
**Area of Interest North of Castner Range**  
USACE - Tulsa District  
El Paso, Texas

**Figure 1**  
Site Location Map  
Explosives Site Plan



**APPENDIX B**  
**FRAGMENTATION DATA REVIEW FORM**

# Fragmentation Data Review Form



Database Revision Date 3/7/2016

Category:

Munition:

Case Material:

Fragmentation Method:

Secondary Database Category:

Munition Case Classification:

DODIC:

Date Record Created:

Record Created By:

Last Date Record Updated:

Individual Last Updated Record:

Date Record Retired:

## Munition Information and Fragmentation Characteristics

Explosive Type:

Explosive Weight (lb):

Diameter (in):

Cylindrical Case Weight (lb):

Maximum Fragment Weight (Intentional) (lb):

Design Fragment Weight (95%) (Unintentional) (lb):

Critical Fragment Velocity (fps):

## Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):

MFD-H [Maximum Fragment Distance, Horizontal] (ft):

MFD-V [Maximum Fragment Distance, Vertical] (ft):

## Overpressure Distances

TNT Equivalent (Pressure):

TNT Equivalent Weight - Pressure (lbs):

Unbarricaded Intraline Distance (3.5 psi), K18 Distance:

Public Traffic Route Distance (2.3 psi); K24 Distance:

Inhabited Building Distance (1.2 psi), K40 Distance:

Intentional MSD (0.0655 psi), K328 Distance:

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

## Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):

TNT Equivalent Weight - Impulse (lbs):

Kinetic Energy  $10^6$  (lb-ft<sup>2</sup>/s<sup>2</sup>):

### Single Sandbag Mitigation

Required Wall & Roof Thickness (in):

Expected Max. Throw Distance (ft):

Minimum Separation Distance (ft):

### Double Sandbag Mitigation

Required Wall & Roof Thickness (in):

Expected Max. Throw Distance (ft):

Minimum Separation Distance (ft):

### Water Mitigation

Minimum Separation Distance (ft):

Water Containment System:

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

## Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	<input type="text" value="1.47"/>	<input type="text" value="1.47"/>
Mild Steel:	<input type="text" value="0.12"/>	<input type="text" value="0.12"/>
Hard Steel:	<input type="text" value="0.10"/>	<input type="text" value="0.10"/>
Aluminum:	<input type="text" value="0.24"/>	<input type="text" value="0.24"/>
LEXAN:	<input type="text" value="1.71"/>	<input type="text" value="1.71"/>
Plexi-glass:	<input type="text" value="0.90"/>	<input type="text" value="0.90"/>
Bullet Resist Glass:	<input type="text" value="0.70"/>	<input type="text" value="0.70"/>

## Item Notes

The TNT equivalency for black powder rounds has been updated from 0.4 to 0.43 to agree with Rev 4 of TP 16. This has resulted in minor changes in values.

Distribution authorized to the Department of Defense and U.S. DoD contractors only for Administrative-Operational Use (17 October 2002). Other requests shall be referred to the Chairman, Department of Defense Explosives Safety Board, Room 856C, Hoffman Building I, 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.

**Community Relations Plan**  
**Remedial Investigation/Feasibility Study**  
**for Area of Interest North of Castner Range**  
**El Paso, Texas**

**Contract Number: W912DY-10-D-0027 – Delivery Order: DS01**

**June 2017**

**Version: Final**

*Prepared for*

**U.S. Army Corps of Engineers, Tulsa District**  
**CECT-SWT-E**  
**1645 South 101<sup>st</sup> East Ave.**  
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*Prepared by*

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**404-636-0928**

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**Acronym List**

AOI	area of interest
Army	U.S. Army
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Action
CRP	Community Relations Plan
DoD	U.S. Department of Defense
DPW-E	Directorate of Public Works – Environmental Division
EPA	U.S. Environmental Protection Agency
FS	feasibility study
IRP	Installation Restoration Program
MD	munitions debris
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OB/OD	open burn/open detonation
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
SARA	Superfund Amendments and Reauthorization Act
TAG	Technical Assistance Grant
TCEQ	Texas Commission on Environmental Quality
TPP	technical project planning
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USAESCH	U.S. Army Engineering and Support Center Huntsville

## 1. INTRODUCTION

---

The U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at the Area of Interest (AOI) North of Castner Range, El Paso, Texas, under the Defense Environmental Restoration Program – Military Munitions Response Program (MMRP). The U.S. Department of Defense (DoD) established MMRP to address military munitions located on current and Formerly Used Defense Sites. Based on historical records and previous investigations, this AOI may contain munitions and explosives of concern (MEC).

DoD has the responsibility for identifying, investigating, and determining cleanup activities related to former DoD facilities under MMRP. USACE is the lead agency responsible for managing the environmental response at the AOI and is supported by the U.S. Army Environmental Command (USAEC), Fort Bliss, Texas, and the lead regulatory agency, Texas Commission on Environmental Quality (TCEQ). Regulatory contact information is provided in **Appendix A**.

## 2. OVERVIEW OF THE COMMUNITY RELATIONS PLAN

---

The U.S. Army (Army) has developed this Community Relations Plan (CRP) to facilitate opportunities for the local community and stakeholders to be involved with and kept informed of the environmental investigation at the AOI North of Castner Range at El Paso, Texas. This site is currently entering the remedial investigation (RI) phase of MMRP. This CRP is critical to defining how Fort Bliss will communicate key project activities on the AOI North of Castner Range to the public.

Appropriate and effective communication, as well as timely exchange of information, is imperative to maintain community understanding and support for Fort Bliss and to ensure the success of community relations. Therefore, it is the continuing goal of Fort Bliss to:

- establish effective and comprehensive mechanisms for informing the community of program activities,
- solicit input and identify concerns the local community may have regarding ongoing and planned environmental activities related to the AOI North of Castner Range, and
- maintain a strategy fostering ongoing, two-way communication between the Army and the local community.

The CRP details outreach activities that encourage two-way communication between Fort Bliss and the local community. This communication includes providing opportunities for the community to learn about and comment on the RI at the AOI North of Castner Range. The community involvement activities recommended in the CRP are tailored to the distinct needs of the local community.

The CRP for the AOI North of Castner Range has been prepared in accordance with Engineer Pamphlet 200-3-1, *Public Participation Requirements for Defense Environmental Restoration Program* (USACE, 2011). In addition, this CRP was prepared in accordance with current U.S. Environmental Protection Agency (EPA) guidance, including *Superfund Community Involvement Handbook* (EPA, 2016) and *Resource Conservation and Recovery Act Public Participation Manual* (EPA, 2017). These handbooks outline the community involvement requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986; the 1976 Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Act of 1984; and as stipulated in the guidance that interpret the Superfund legislation: the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The following sections of the CRP summarize the history of the installation, the AOI, and MMRP; profile the local community audience; summarize prior community involvement activities; identify community questions, concerns, perceptions, and communication preferences; and detail the current activities available for communicating with the public.

For more information regarding this document or the Fort Bliss environmental program, contact the following people.

Ron Baca  
Directorate of Public Works  
Environmental Division  
ATTN: IMBL-PWE  
Building 622, Taylor Road  
Fort Bliss, TX 79916  
915-568-7979  
[ronald.h.baca.civ@mail.mil](mailto:ronald.h.baca.civ@mail.mil)

Guy Volb  
Public Affairs Office  
Fort Bliss, TX 79916  
915-568-4505  
[guy.a.volb.civ@mail.mil](mailto:guy.a.volb.civ@mail.mil)

### **3. SITE DESCRIPTION AND HISTORY**

---

The following subsections provide an overview of the AOI North of Castner Range.

#### **3.1. Property Description and Location**

The AOI North of Castner Range is 7,936 acres located in El Paso County, Texas. Of this 7,936 acres, 5,860 acres will be investigated during this RI/feasibility study (FS) due to safety concerns related to issues with terrain. It is located north of the Closed Castner Range and is bounded by Martin Luther King Boulevard on the east, the Franklin Mountains State Park on the west, and Stan Roberts Sr. Avenue on the north. Housing developments exist to the southeast and an operating quarry is just north of the northern boundary. The AOI location is shown in **Figure 3-1**.

The AOI North of Castner Range is currently owned by the state of Texas (Franklin Mountains State Park) and the city of El Paso, Texas. Current land uses at the AOI include recreation on state park land and ranching.

#### **3.2. Property History**

The AOI North of Castner Range was identified when munitions debris (MD) items were found during background sampling activities associated with the adjacent Closed Castner Range. The MD was identified mostly in the southern portion of the AOI and included small arms casings, fragments of munitions of unknown type and model, and expended 75mm shrapnel projectiles. It is assumed that the MD came from the adjacent Closed Castner Range either as kick-out debris from the open burn/open detonation (OB/OD) unit or possibly from overshoot during training exercises.

Research did not identify any range fans that overlapped the AOI, the AOI was never owned or leased by Fort Bliss, and there is no official record of it having been used by Fort Bliss. Any munitions items identified likely came from either early undocumented potential use as a live-fire training area for artillery units or may have been dispersed during demolition explosions from disposal activities in the northeastern corner of the adjacent Closed Castner Range. One of its potential uses as a training site for the 82<sup>nd</sup> Field Artillery Regiment, 82<sup>nd</sup> Field Artillery Battalion, and 1<sup>st</sup> Cavalry Division indicates that it would not have been used before the units were established in 1916 and not after records indicate the beginning of use of the adjacent Closed Castner Range in 1926. The artillery units would have trained with munitions similar to those identified at the AOI previously—75mm projectiles. The Closed Castner Range was no longer used after 1966; therefore, MEC and MD items potentially present at the AOI from kick-out associated with the OB/OD area would be from the date range of 1926 to 1966.

#### **3.3. Previous Investigations**

A MEC reconnaissance survey was conducted by U.S. Army Engineering and Support Center Huntsville (USAESCH) from 2013 to 2015. The survey was conducted to gather sufficient data to determine the MEC-related characteristics of the site and categorize the site into “Recommend RI” and “Recommend No RI” (USAESCH, 2015).

The survey was an instrument-assisted qualitative and quantitative reconnaissance that documented items encountered on the surface as well as quantities of detected subsurface anomalies. The AOI North of Castner Range exhibited evidence of past military training activity primarily in the southern portion. The majority of the northern area exhibited no evidence of explosives hazards.

Munitions-related observations ranged from no evidence of explosive hazards to several expended 75mm shrapnel projectiles as well as fragments from light, medium, and heavy high-explosive munitions. No MEC items and no range-related debris were observed; however, 88 MD items and 1,020 cultural debris items—such as barbed wire—were identified (USAESCH, 2015).

## **4. COMMUNITY BACKGROUND**

---

The following section includes a description of the community in the project area, a chronology of community involvement, a summary of key community concerns identified during previous community interviews, the response to these key concerns, and communication requirements. Examples of interview questions are provided in **Appendix B**.

### **4.1. Community Profile**

The Fort Bliss cantonment area is in west Texas within the city limits of El Paso in El Paso County, Texas. The remainder of its contiguous acreage sprawls across portions of Texas and New Mexico, extending 45 miles north to New Mexico's White Sands Missile Range and 75 miles northeast to New Mexico's Lincoln National Forest.

#### **4.1.1. Fort Bliss**

Fort Bliss is a census-designated place located in El Paso County, Texas (<https://www.census.gov/quickfacts/table>). According to most recent available census data, Fort Bliss has a total population of 8,591. This population is comprised of Army and other military personnel and their families stationed at Fort Bliss and does not include soldiers rotating through Fort Bliss for training purposes. The population density is 1,398.7 people per square mile.

The racial makeup of Fort Bliss is 60.8% White alone (not Hispanic or Latino), 18.3% Hispanic, 14.5% African American alone, 1.6% Native American alone, 2.4% Asian alone, 0.3% Pacific Islander alone, and 5.0% from two or more races.

There are 1,525 housing units and 1,421 households with 4.02 persons per household. In Fort Bliss, the age distribution is 26.6% under the age of 18, 73.2% between the ages of 18 and 64, and 0.2% who are 65 years of age or older. The population is 65.8% male and 34.2% female.

The median income for a household in Fort Bliss is \$48,610 and the per capita income for Fort Bliss is \$19,017 with 13.1% of the population below the poverty line.

At Fort Bliss, 97.1% of people age 25 or older are high school graduates and 29.9% of people have a bachelor's degree or higher.

#### **4.1.2. El Paso, Texas**

According to most recent available census data (<https://www.census.gov/quickfacts/table>), El Paso, Texas, has a total population of 649,121 with 29.1% of persons under the age of 18, 59.7% between the ages of 18 and 64, and 11.2% 65 years or older. The population is 48% male and 52% female.

The racial makeup of El Paso, Texas, is 14.2% White alone (not Hispanic or Latino), 80.7% Hispanic, 3.4% African American alone, 0.7% Native American alone, 1.2% Asian alone, 0.1% Pacific Islander alone, and 2.7% from two or more races.

There were 227,605 housing units and 220,682 households with 3.03 persons per household. In El Paso, Texas, 78% of people age 25 or older are high school graduates and 23.2% of people have a bachelor's degree or higher.

The median income for a household in El Paso, Texas is \$42,772 and the per capita income is \$20,154 with 20.9% of the population below the poverty line.

The population density is 2,543.2 people per square mile.

#### 4.1.3. El Paso County, Texas

According to most recent available census data (<https://www.census.gov/quickfacts/table>), El Paso County, Texas, has a total population of 800,647 with 27.9% of persons under the age of 18, 60.5% between the ages of 18 and 64, and 11.6% 65 years or older. The population is 48.4% male and 51.6% female.

The racial makeup of El Paso County, Texas, is 13.1% White alone (not Hispanic or Latino), 82.2% Hispanic, 3.1% African American alone, 0.8% Native American alone, 1.0% Asian alone, 0.1% Pacific Islander alone, and 2.5% from two or more races.

There were 270,307 housing units and 259,612 households with 3.14 persons per household.

In El Paso County, Texas, 75.7% of people age 25 or older are high school graduates and 21.35 of people have a bachelor's degree or higher.

The median income for a household in El Paso, Texas is \$41,637 and the per capita income is \$18,880 with 20.3% of the population below the poverty line.

The population density is 790.6 people per square mile.

## 4.2. History of Community Involvement

Fort Bliss is committed to using community relations activities appropriate to the environmental program for the AOI North of Castner Range. The following section outlines the various opportunities that the Fort Bliss Directorate of Public Works – Environment Division (DPW-E) has provided for community participation through its Installation Restoration Program (IRP) and MMRP.

Fort Bliss follows a standard community relations program that focuses on interagency, local community, and employee communication techniques. These techniques, which will be followed during the environmental response activities at the AOI North of Castner Range, include the following.

- Maintain the Restoration Advisory Board (RAB) that was established in 1997. The RAB consists of volunteer community members, Army representatives, and federal/state/local regulators who review the status of the cleanup program and participate in the decision-making process. RAB meetings are open to the public and will be advertised by Fort Bliss in local newspapers and other media outlets.
- Implement technical project planning (TPP) throughout the project as meetings of internal project stakeholders. These meetings not only help build the technical tasks within the project scope but also help develop a direct pathway to the community involvement process. Information obtained from TPP meetings can help set agendas for future public meetings. Official stakeholders, many of which represent local community concerns, have been identified during previous work conducted at Fort Bliss. Three TPP sessions are planned for this environmental response effort.
- Use public notifications, meetings, and public comment periods at appropriate milestones for public involvement and review specific site investigation results and decisions. Responsiveness

summaries are prepared following the open comment periods to summarize and address comments. The effort will include two public meetings, further described in **Section 5**.

- Produce press and fact sheet releases to inform the public of investigation results as specific milestones are reached.
- Coordinate community meetings and briefings with regulators and local officials to discuss project activities with the general public and local officials.
- Maintain a mailing list of interested community members and local officials to distribute status updates, fact sheets, and public notifications. Contact information for local officials is listed in **Appendix C**, state officials in **Appendix D**, federal representatives in **Appendix E**, citizens groups in **Appendix F**, and media contacts in **Appendix G**.
- Maintain the Administrative Record providing public access to investigation reports, feasibility studies, responsiveness summaries, Records of Decision, fact sheets, remedial designs, and news releases. The Administrative Record and the information repository are established at the DPW-E (**Appendix H**).
- Establish a point of contact at the Public Affairs Office to assist with inquiries about the environmental program and obtain technical assistance as needed.
- Make available other as-needed techniques including site tours, installation newspaper articles, and articles in civic organization newsletters.
- Create a website to provide public access to news, meeting announcements, and available documents.
  - Environmental Division: <https://www.bliss.army.mil/DPW/Environmental/index.html>
  - Public Affairs Office: <https://www.bliss.army.mil/PAO/>

#### **4.3. Key Community Concerns**

Key community concerns associated with the AOI North of Castner Range include the following.

- Current land use (e.g. maintaining recreational use and ranching capabilities)
- Future land use
- Development of the property
- Timing and completion of future phases of project
- Safety of residents.

As progress on the RI tasks, and other future MMRP phases, continues at the AOI North of Castner Range, project status will be monitored as activities are completed and initiated to educate the public and to encourage them to participate in the remedial action process.

#### **4.4. Response to Community Concerns**

Recent public meetings, in the form of the RAB, have been held to keep the public informed about the investigation and field work to be conducted at the AOI North of Castner Range. Over the course of the RI and follow-up project phases, the Army will continue public involvement activities and incorporate stakeholder input during TPP and public meeting forums.

#### **4.5. Summary of Communication Needs**

Planned or completed public information activities include hosting a variety of meetings intended to engage specific elements with the public. These include:

- public meetings (intended for nearby residents, general public, and others interested in the future plans for the AOI);
- RAB meetings (intended for the general public); and

- TPP planning meetings (intended for official project stakeholders that represent specific interests for the current and future use of the AOI and have input on the project planning)

The following additional activities are required.

- Place notices in local newspapers (both English and Spanish—Mexican dialect)
- Develop presentation materials that graphically and narratively describe the AOI and the actions being undertaken
- Provide Spanish language interpreters for meetings
- Maintain records on a public website (Fort Bliss DPW-E).

## **5. PUBLIC INVOLVEMENT PROGRAM**

---

The overall goal of the CRP is to implement the community involvement activities to ensure that residents of the adjacent housing area and recreational users of the Franklin Mountains State Park are aware of the potential hazards associated with MEC. The public will be informed of the progress and results of the environmental response activities at the AOI.

### **5.1. Objectives**

The CRP is designed to encourage the public's involvement in the environmental program by providing information to the public and media on a timely basis. The program is also designed to be flexible so that as community information needs evolve and change, the public involvement program can be adjusted.

Therefore, the following objectives have been set for the AOI North of Castner Range public involvement program.

- Establish effective and comprehensive mechanisms for informing the community of environmental program activities
- Solicit input and identify concerns the local community may have regarding ongoing and planned environmental program activities
- Maintain a strategy fostering ongoing, two-way communication between the Army and the local community.

These objectives will be addressed by implementing the community relations actions described in the following section.

### **5.2. Community Relations Activities**

The community relations activities presented in this section are based on community concerns, Engineer Pamphlet 200-3-1 (USACE, 2011) and regulatory guidance outlined in the EPA *Superfund Community Involvement Handbook* (EPA, 2016) and *Resource Conservation and Recovery Act Public Participation Manual* (EPA, 2017). The activities are presented below in the order of those required to occur at particular milestones throughout the program, followed by those that may be appropriate for the program depending on community interest or project circumstances.

The proposed schedule for these activities is detailed in **Section 5.3**.

#### **5.2.1. Point of Contact**

The point of contact for community relations at Fort Bliss is the DPW-E IRP Manager in conjunction with the Public Affairs Office. The IRP Manager is the primary liaison between the community and the Army and works to ensure prompt, accurate, and consistent responses and information dissemination about the site. The IRP Manager is responsible for drafting information about the environmental restoration program and for ensuring that inquiries about the progress of the investigations, remedial actions, and other cleanup activities at AOI North of Castner Range are responded to in a timely and accurate manner. The IRP Manager also determines which activities are required or appropriate to meet the objectives of the CRP based on effectiveness and community interest. The IRP Manager will coordinate all community relations activities in conjunction with the Public Affairs Office. As the environmental program and community relations evolve over time, the IRP Manager will adjust and tailor the CRP to the changing circumstances.

Mr. Ron Baca  
Directorate of Public Works  
Environmental Division  
ATTN: IMBL-PWE  
Bldg 622, Taylor Road  
Fort Bliss, TX 79916  
915-568-7979  
[ronald.h.baca.civ@mail.mil](mailto:ronald.h.baca.civ@mail.mil)

#### 5.2.2. Information Repository

A public Information Repository is required under CERCLA to provide interested parties background and technical information about the environmental program at Fort Bliss. An Information Repository has been established at the Directorate of Public Works on the installation to provide a convenient location where Fort Bliss residents and the general public can go to read and copy official documents and other pertinent information about the AOI. The Information Repository includes work plans, technical reports, summary documents, and other information of public interest (e.g., fact sheets and news releases). The repository is accessible to the physically challenged, has copier facilities, and is available to the public during normal business hours. All that is needed to get onto this installation to access the Information Repository is a photo ID. The address and phone number for the buildings housing the Information Repository are presented in **Appendix H**.

#### 5.2.3. Administrative Record

The Administrative Record is currently located in the same location as the Information Repository at the DPW-E. For sites undergoing CERCLA investigations, the NCP requires that an Administrative Record be established at or near the facility under investigation. The Administrative Record includes information that may form the basis for selecting a response or remedial action. It includes all documents leading to the selection of any response action at the installation and contains documents similar to those located in the Information Repository. The address and phone number for the buildings housing the Administrative Record are presented in **Appendix H**.

#### 5.2.4. Public Notices

Public notices will be issued to announce milestone events related to remedial activities at the AOI North of Castner Range. Examples of milestones that would require a public notice include but are not limited to the following.

- Announcements of initiation of major work phases (e.g., RI, FS, etc.)
- Status updates regarding completion of major work phases
- The publication and availability of the RI Report
- The publication and availability of the Proposed Plan
- The publication and availability of Final Decision Document
- Regulatory related decisions.

Public notices serve as official notification to the local community of project plans for environmental activities, upcoming public involvement opportunities, and the availability of documents at the Information Repositories.

Public notices can be prepared and placed in local newspapers, made available as public service announcements to broadcast media, and/or included along with fact sheets sent to those on the mailing list.

#### 5.2.5. Evacuation Notices

It is not anticipated that road closures or evacuations of the residential neighborhood adjacent to the AOI North of Castner Range will be required. However, should circumstances change, this CRP will be updated accordingly.

#### 5.2.6. Public Meetings

Public meetings will be held during the course of this RI/FS to present and update the community on investigation developments and address community questions, concerns, ideas, and comments. Public meetings, both informal and formal, are intended to inform the community about ongoing site activities and to discuss and receive feedback from the public on proposed courses of action or results of the implemented action. Two public meetings are planned for this project. One public meeting will be held before field activities begin to inform the local community of the work to be performed. The second public meeting will be held after completing field activities to update the community on the results of the investigation. Additional public meetings for future phases of work will be determined as needed in the future. Spanish language interpreters will be provided at all public meetings to facilitate communication for all participants.

A public notification will precede the public meeting and the corresponding comment period. The public comment period lasts for at least 30 calendar days, allowing time for review and comment on the proposed changes. Public comments will be recorded at these meetings and during the comment period, and will be responded to through a responsiveness summary compiled by the Fort Bliss Public Affairs Office and IRP Manager.

Meetings will be announced through public notices, news releases, direct mailings, or a combination of the three at least 3 weeks prior to any scheduled meeting. **Appendix H** contains suggested meeting locations.

#### 5.2.7. Public Comment Periods

Public comment periods give community members an opportunity to review and comment on various documents, especially the Proposed Plan. The review period provides an opportunity for the citizens to have meaningful involvement in the process while giving the project delivery team valuable information from the community. Public comment periods will be made available at the following CERCLA milestones.

- Publication of the RI and FS (separate deliverables)
- Publication of the Proposed Plan
- Regulatory-related decisions.

Each comment period will be announced separately, if necessary. Announcements will appear in local English- and Spanish-language newspapers. Information on the duration and how and where to submit comments will be included. Following notification, the public will have a 30-day period to review and provide comments on the de-listing documents or cleanup methods. Public comments will be recorded during the comment period and will be responded to through a responsiveness summary.

#### 5.2.8. Responsiveness Summaries

At the conclusion of the public comment periods, the Army will prepare a responsiveness summary or meeting minutes that summarize and respond to the comments received during the public comment period, including those comments given at the public meeting.

The responsiveness summary is issued as part of the document under comment or, in the case of a Proposed Plan, included as part of the Decision Document and made available in the Information Repositories listed in **Appendix H**.

#### 5.2.9. Mailing List Update

The Public Affairs Office, in conjunction with the IRP Manager, will maintain and update a current mailing list. Mailing lists are an important component of effective community outreach that ensure that interested community members, as well as other stakeholders and communities impacted by or interested in response activities, are kept informed of activities and opportunities for community involvement. A mailing list is used to distribute news releases, fact sheets, and other types of pertinent information for project activities.

Considered one of the cornerstones of an effective outreach strategy, the project mailing list will consist of interested individuals, local officials, and media representatives. The mailing list will be updated as necessary and appropriate and will provide information during all community relations activities about how individuals and groups can be added to the mailing list. Additionally, an e-mail contact list will be developed for those community members and stakeholders who prefer to receive project information in an electronic format. Contact information for local officials is listed in **Appendix C**, state officials in **Appendix D**, federal representatives in **Appendix E**, citizens groups in **Appendix F**, and media contacts in **Appendix G**.

#### 5.2.10. Restoration Advisory Board

Fort Bliss has supported an active and engaged RAB since 1997 and will continue to support a RAB as installation-restoration activities continue. Interest in the RAB will be solicited as appropriate to facilitate and maintain its formation. The Army anticipates that the AOI North of Castner Range RI activities will be a key discussion item for the RAB. The RAB reviews the technical information developed during and following the RI. The RAB provides an open forum for discussion and exchange of information between the public and the government agencies involved. The members also help Fort Bliss share information with the local community. Included in this group are leaders of local community groups, citizen representatives, and local public officials. The RAB currently meets at least once a year, generally in late February or early March, and will continue to do so as the status of the program warrants.

#### 5.2.11. Media Releases

Media releases, including fact sheets or status reports, will be distributed to community newsletters (i.e., civic organizations, community associations, etc.) as well as local and installation newspapers on an annual basis. The status reports will provide citizens with current, accurate, easy-to-read, easy-to-understand information about program and site activities to a broad community audience. In addition to providing status updates, releases will highlight upcoming community relations activities (including the RAB meeting schedule), point of contact information, and instructions detailing how to join the mailing list. All media releases will be coordinated through the Public Affairs Office.

### 5.2.12. Update Community Relations Plan

The CRP will be updated every 3 years or earlier, as needed, based on changes in program requirements, community concerns, and/or transition to later project phases. This CRP is a working document to guide the project staff. The CRP will be re-evaluated at these times to ensure that the schedule of community relations activities is appropriate.

## 5.3. Projected Schedule

**Table 5-1** summarizes community relations activities that are intended to keep the community informed of and involved in the investigation and cleanup activities. Activities required at set milestones identified by CERCLA are presented, as well as additional activities recommended for inclusion in the Fort Bliss CRP based on community needs and installation resources.

**Table 5-1**  
**Schedule of Community Relations Plan Activities**

Activity		Frequency
<b>Required Activities</b>		
Maintain a point of contact		Continuous
Update and maintain Information Repository		Continuous
Update and maintain Administrative Record		Continuous
Public notification		Publication of RI, FS, Proposed Plan, and Final Decision Document
Hold public meetings		Two meetings for RI As needed for future phases
Provide for a public comment period		Publication of RI, FS, and Proposed Plan
Complete and distribute a Responsiveness Summary		Publication of RI, FS, and Proposed Plan
Update and maintain mailing list		Continuous
<b>Additional Activities</b>		
Maintain RAB		Continuous
Publish and distribute media releases		Annually (or as needed)
Update Community Relations Plan		As needed, following completion of major CERCLA work phases, or every 3 years

## 5.4. Community Grant Opportunities

Two programs are available to assist communities in obtaining the technical resources needed to effectively review and evaluate environmental restoration activities. These two programs are summarized in the following sections.

#### 5.4.1. Technical Assistance Grant Program

The Technical Assistance Grant (TAG) Program, which was established under SARA of 1986, promotes community involvement by providing qualified community groups (RABs, technical review committees, etc.) with funds to help the community participate in the decision-making process at National Priorities List (NPL) sites. TAGs allow community groups to obtain objective, independent scientific and engineering support by hiring a technical advisor who can help the community interpret and comment on the cleanup process. TAG awards are limited to \$50,000 per NPL site and are subject to certain regulations. Specific information regarding the TAG Program is available at:

<https://www.epa.gov/superfund/technical-assistance-grant-tag-program>. The AOI North of Castner Range RI/FS is not eligible for the TAG Program because the site is not on the NPL.

#### 5.4.2. Technical Outreach Services for Communities

The Technical Outreach Services for Communities program, which is partially funded by grants from EPA, helps communities understand the environmental cleanup and site re-use process. This program uses the resources of researchers and professionals in the environmental science and engineering fields from more than 30 major research universities to provide communities with free, independent technical information needed to actively participate in solving environmental problems.

Specific information regarding the Technical Outreach Services for Communities program is available at:

[https://cfpub.epa.gov/ncer\\_abstracts/index.cfm/fuseaction/display.highlight/abstract/2302](https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.highlight/abstract/2302).

## **6. REFERENCES**

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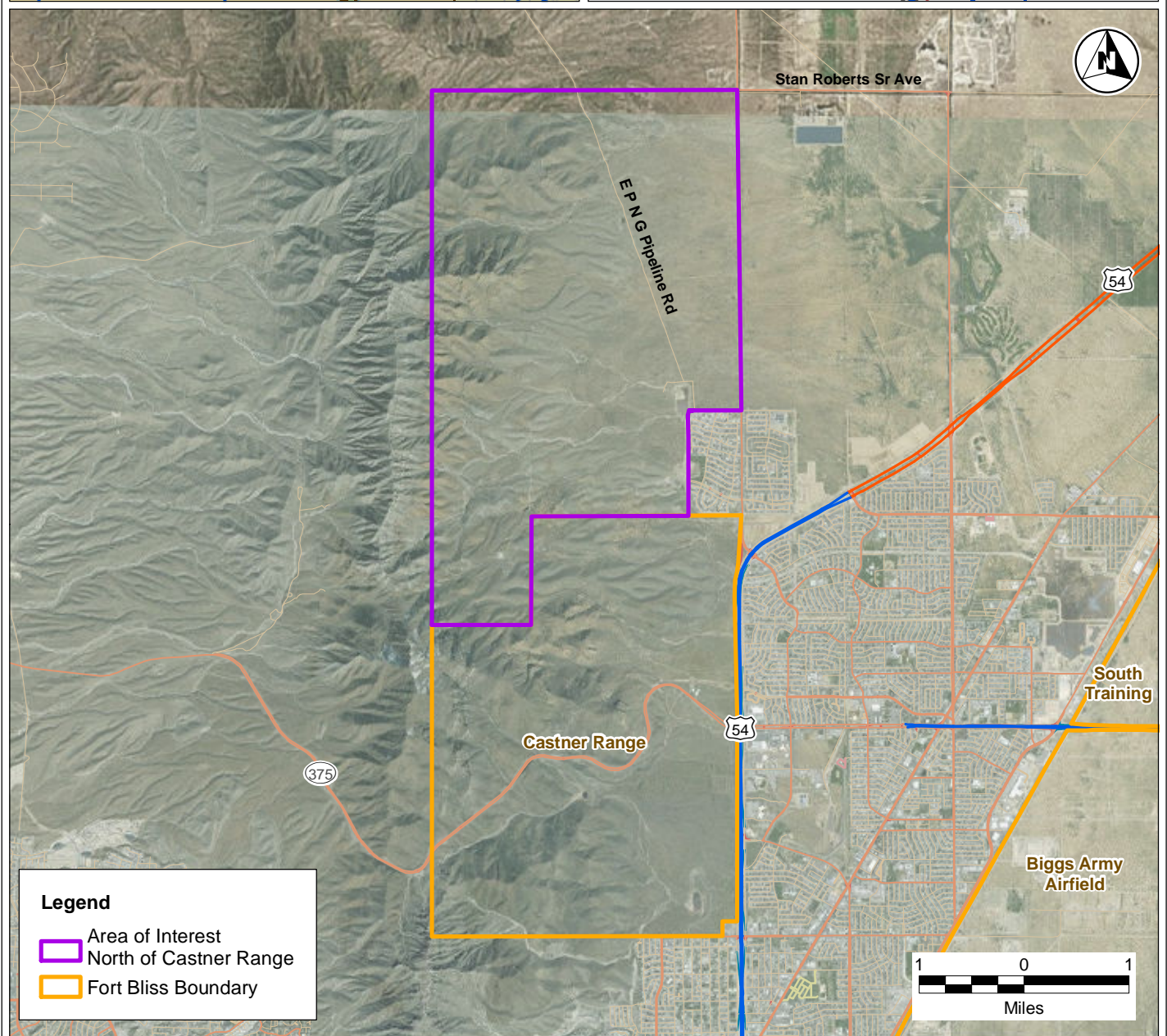
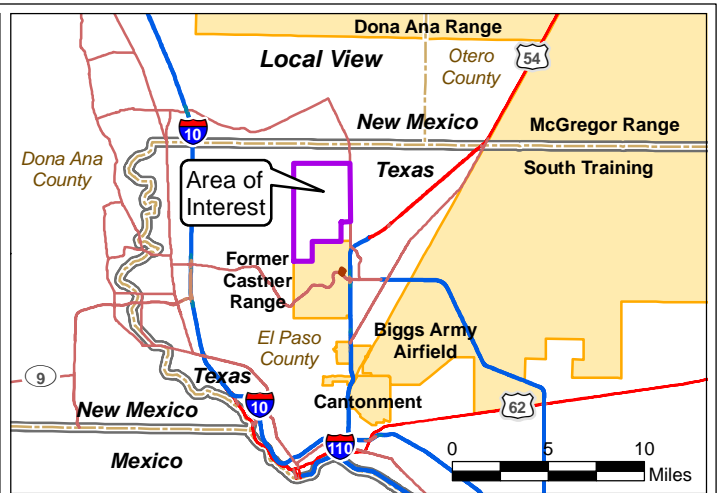
U.S. Army Corps of Engineers, 2011. *Public Participation Requirements for Defense Environmental Restoration Program*, Engineer Pamphlet 200-3-1. September.

U.S. Army Engineering and Support Center Huntsville, 2015. *Final MEC Reconnaissance Survey Report, Former North Castner Range, El Paso, TX*. June.

U.S. Environmental Protection Agency (EPA), 2016. *Superfund Community Involvement Handbook*. January.

EPA, 2017. *Resource Conservation and Recovery Act Public Participation Manual*, 530-R-16-013. [https://www.epa.gov/sites/production/files/2017-01/documents/final\\_rcra\\_ppm.pdf](https://www.epa.gov/sites/production/files/2017-01/documents/final_rcra_ppm.pdf). January.

## **FIGURES**



## APPENDIX A

### REGULATORY CONTACTS

#### Texas Commission on Environmental Quality

Allan Posnick  
TCEQ  
P.O. Box 13087  
Mail Code 221  
Mail Code: 127  
Austin, TX 78711-3087  
Phone: 512-239-2332  
Email: [allan.posnick@tceq.texas.gov](mailto:allan.posnick@tceq.texas.gov)

Ruth Winsor, Mail Code 221  
TCEQ  
P.O. Box 13087  
Mail Code 221  
Austin, TX 78711-3087  
Phone: 512-239-0843  
Email: [ruth.winsor@tceq.texas.gov](mailto:ruth.winsor@tceq.texas.gov)

#### Texas Parks and Wildlife Department

Dr. Cesar Mendez  
State Parks Division  
Franklin Mountains State Park  
1331 McKelligon Canyon Road  
El Paso, TX 79930  
Email: [cesar.mendez@tpwd.texas.gov](mailto:cesar.mendez@tpwd.texas.gov)

## **APPENDIX B**

### **SAMPLE INTERVIEW QUESTIONS**

#### **Privacy Act Statement**

*Authority:* 10 U.S. Code (USC) 2705. *Principal Purpose:* To identify the attitudes and concerns of area residents concerning activities at the Military Munitions Response project during the study phase. The requested information will be used to develop a Community Relations Plan for the specific project in question. The information will also be used by the Army to develop a mailing list of individuals interested in receiving fact sheets and other general information about the study. Disclosure of the requested information is voluntary. Failure to provide all the requested information may lessen the effectiveness of the public involvement program for the project.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone (H): \_\_\_\_\_ (W): \_\_\_\_\_

The primary purpose of collecting input from the community is to identify issues and concerns so that the Army can address them via its community outreach and involvement efforts. To obtain this information, interviewers asked participants the following questions.

1. How long have you lived in this community?
2. Does the community benefit from the proximity to the installation? How would you characterize the relationship between the community and the installation?
3. Are you familiar with what the installation is and what it does? Do you have any concerns about the installation? If so, what are they?
4. How sensitive is the local area to environmental issues on a scale of 1 to 5 (1 = not sensitive, 5 = very sensitive)?
5. What environmental problems are you concerned with in your community?
6. Are you aware of any environmental issues at the installation?
7. What do you know about the environmental issues at the installation?
8. What issues are important to you in terms of the installation environmental investigation and cleanup? Health issues? Costs? Time? Any others?
9. When did you first become aware of the environmental issues? How did you become aware?
10. How or where have you received most of your information about environmental issues at the installation? (newspaper, TV stations, radio, newsletter, other)
  - a. In your opinion, do the media in the area do an adequate job on reporting environmental news?
11. What organizations or individuals do you consider to be the most credible when it comes to environmental issues associated with the installation's restoration program? Least credible?
12. Have you had any contact with local, state, or other officials regarding the environmental restoration program?
  - a. If so, what was the nature of the contact?
  - b. What kind of response did you receive?
13. Do you have confidence in the Army's ability to implement environmental cleanup at the installation?
  - a. If no, how can the Army's credibility be improved?
14. What do you know about the history of community involvement concerning the

- environmental restoration at the installation?
- a. Have you personally been involved with the installation in any way?
  - b. Are you aware of any individuals or groups who have emerged as leaders on this issue?
  - c. Do you feel these individuals/groups adequately represent your concerns?
15. Do you feel you have been kept adequately informed about the installation's environmental programs?
16. How can those responsible best provide information concerning restoration activities at the installation (public meetings, letters, fact sheets, workshops, open houses, service organizations, speakers)? How frequently?
17. The installation has formed a Restoration Advisory Board (RAB) to review environmental issues and advise on cleanup activities.
- a. Have you attended a meeting?
  - b. Would you like to be considered for membership?
  - c. Who would you recommend?
  - d. Do you feel there should be a RAB?
18. What would be the best location for community meetings? The best day of the week and time to hold a meeting?
19. Are you aware of the information repository available for public use?
- a. Would you use an information repository?
  - b. What would you like to see in the repository?
  - c. Are these locations convenient for you? If no, where would be convenient for you?
20. Do you have any questions you would like answered about the installation or its Environmental Restoration Program? If you have any questions or comments in the future, how would you like the installation to respond to them (in writing, by phone, in newsletters, etc.)? Do you prefer information to be sent electronically or by mail?
21. Do you have any other comments, questions, or concerns about the installation?
22. Can you suggest anyone else (friend, neighbor, group, informal or formal leader) that we should contact or who might want to be included in this community survey?
23. Is there anything else you would like to mention that we have not talked about? If in answering this question you provide "historical" information, please identify the source of this information.

## APPENDIX C

### LOCAL OFFICIALS

#### Mayor

Oscar Leeser  
300 North Campbell  
El Paso, TX 79901  
Phone: 915-212-0021  
Email: [mayor@elpasotexas.gov](mailto:mayor@elpasotexas.gov)

#### City of El Paso

Miguel Parra  
Environmental Services  
7968 San Paulo Drive  
El Paso, TX 79907  
Phone: 915-212-6208  
Email: [ParraMX@elpasotexas.gov](mailto:ParraMX@elpasotexas.gov)

#### District 4 Representative

Carl L. Robinson  
300 North Campbell  
El Paso, TX 79901  
Phone: 915-212-0004  
Fax: 915-212-0014  
Email: [district4@elpasotexas.gov](mailto:district4@elpasotexas.gov)

## APPENDIX D

### STATE OFFICIALS

#### Governor

Greg Abbott  
Office of the Governor  
Mailing Address: P.O. Box 12428, Austin, Texas 78711  
Delivery Address: State Insurance Building, 1100 San Jacinto, Austin, Texas 78701  
Phone: 512-463-2000

#### Texas State Senate

Senator Jose Rodriguez  
Texas State Senate District 29  
El Paso District Address:  
100 N. Ochoa, Suite A  
El Paso, TX 79901  
Phone: 915-351-3500

#### Texas State House of Representatives

Representative Mary González  
Texas State House District 75  
El Paso District Address:  
11200 Santos Sanchez  
Socorro, TX 79927  
Phone: 915-790-2299

Representative Cesar Blanco  
Texas State House District 76  
El Paso District Address:  
9440 Viscount, Suite 205  
El Paso, TX 79925  
Phone: 915-599-9807

Representative Evelina “Lina” Ortega  
Texas State House District 77  
Capitol Address:  
Room E2.704  
P.O. Box 2910  
Austin, TX 78768  
Phone: 512-463-0638



**Community Relations Plan  
Remedial Investigation/Feasibility Study for  
Area of Interest North of Castner Range  
El Paso, Texas**

Representative Joe Moody  
Texas State House District 78  
El Paso District Address:  
5675 Woodrow Bean, Suite 12  
El Paso, TX 79924  
Phone: 915-751-2700

Representative Joe C. Pickett  
Texas State House District 79  
El Paso District Address:  
1790 Lee Trevino #307  
El Paso, TX 79936  
Phone: 915-590-4349

## APPENDIX E

### FEDERAL ELECTED OFFICIALS

#### U.S. Senate

Senator John Cornyn  
517 Hart Senate Office Bldg. Washington, DC 20510  
Phone: 202-224-2934  
Fax: 202-228-2856  
Web: <http://cornyn.senate.gov/>

Senator Ted Cruz  
404 Russell  
Washington, DC 20510  
Phone: 202-224-5922  
Web: <http://cruz.senate.gov/>

#### U.S. House of Representatives

Congressman Beto O'Rourke  
Congressional District 16  
1330 Longworth House Office Building  
Washington, DC 20515  
Phone: 202-225-4831  
Web: <http://orourke.house.gov/>

Congressman Will Hurd  
Congressional District 23  
317 Cannon House Office Building  
Washington, DC 20515  
Phone: 202-225-4511  
Web: <http://hurd.house.gov/>

## APPENDIX F

### ENVIRONMENTAL AND ACTIVE CITIZENS GROUPS

#### Chihuahuan Desert Education Coalition

Rick Lobello  
913 Totonaca El Paso, TX 79912  
Phone: 915-474-1456  
Email: [ricklobello@cs.com](mailto:ricklobello@cs.com)

#### Franklin Mountains Wilderness Coalition

Judy Ackerman (Secretary)  
Franklin Mountains Wilderness Coalition 3344 Eileen Drive  
El Paso, TX 79904  
Phone: 703-622-0661  
Email: [j.p.Ackerman@sbcglobal.net](mailto:j.p.Ackerman@sbcglobal.net)

#### Frontera Land Alliance

Doug Echlin  
Frontera Land Alliance 3800 N. Mesa Suite A2-258  
El Paso, TX 79902  
Phone: 915-584-8074  
Email: [dechlin518@aol.com](mailto:dechlin518@aol.com)

## APPENDIX G

### MEDIA CONTACTS

#### **Newspapers**

##### **Fort Bliss Bugle**

Guy A. Volb (Director)  
Garrison Public Affairs, IMLB-PA  
Building 15, Slater Road  
Fort Bliss, TX 79916-6812  
Phone: 915-568-4505 or 568-4601  
E-mail: [guy.a.volb.civ@mail.mil](mailto:guy.a.volb.civ@mail.mil)  
Web: <http://fortblissbugle.com/>

##### **El Paso Times**

500 West Overland Drive, #150  
El Paso, TX 79901  
Phone: 915-546-6159  
General Phone: 915-546-6100  
Classifieds: 915-546-6406

##### **El Diario de El Paso**

1801 Texas Ave.  
El Paso, TX 79901  
Phone: 915-838-1600

##### **The Prospector**

The University of Texas at El Paso Student Publications Board  
105 Union East  
El Paso, TX 79968  
Phone: 915-747-7434

##### **What's Up**

120 Porforio Diaz Street  
El Paso, TX 79902  
Phone: 915-534-4422  
Email: [web@whatsuppub.com](mailto:web@whatsuppub.com)

## APPENDIX H

### REPOSITORY LOCATIONS

#### Information Repository and Administrative Records

Directorate of Public Works  
Environmental Division  
Bldg 622, Taylor Road  
Fort Bliss, TX 79916  
Phone: 915-568-7979

## **APPENDIX I**

### **MEETING LOCATIONS**

#### **El Paso Police Department, Northeast Station**

9600 Dyer Street  
El Paso, TX 79904  
Phone: 915-212-8100

#### **Chapin High School**

7000 Dyer Street  
El Paso, TX 79904  
Phone: 915-236-4400

November 21, 2011

Tulsa District, U.S. Army Corps of Engineers  
ATTN: CESWT-EC-EA (b) (6)  
1645 S. 101<sup>st</sup> E. Ave.  
Tulsa, OK 74128-4629

B/w

Re: Final Letter Report for the Cover and Borrow Area Investigation of the Oro Grande Landfill (SWMU-25/FTBL-14), Fort Bliss, New Mexico, Contract No. W912BV-04-D-2008, Task Order No. 0007, Modification 3

Dear (b) (6)

Malcolm Pirnie is pleased to provide this letter report for the cover and borrow area investigation at the Oro Grande Landfill (SWMU-25/FTBL-14) Fort Bliss, New Mexico. The purpose of the activities conducted at the site was to estimate the thickness and volume of waste and cover material in the landfill and to evaluate the geotechnical characteristics of the existing landfill cover material and soils from potential borrow sources for future cover material.

### **Background**

The choice facing the Government in reaching a final closure of the Orogrande Landfill and the task in the present contract is which type of closure presents the Government and Fort Bliss with the best life cycle cost; close in place with a standard engineered cover, or an arid exemption/evapotranspiration (ET) cap or to totally dig up the waste and haul it to a licensed permitted New Mexico landfill and just fill in the resulting hole. Therefore the aim of the "Cover and Borrow Area Investigation" was to determine if there was suitable cover material either presently on top of the waste and/or nearby that would be acceptable for an ET cover. By "suitable cover material" is defined by Part 20.9.6.9.A (1)(a)(b) and (c) NMAC of the Rules is "...a minimum of 18 inches of earthen materials having a saturated hydraulic conductivity (hc) less than or equal to the saturated hydraulic conductivity of any bottom liner system or natural subsoil present, or a saturated hydraulic conductivity (hc) no greater than  $1 \times 10^{-5}$  cm/sec whichever is less .....

### **Activities**

**Dig Permit** - Malcolm Pirnie began the dig permit application on July 27, 2010 and found that the application process was then much more involved than previous applications. Eleven approvals and site visits from three utility companies are needed to complete the permit. During the application process the Conservation Branch of the Fort



Bliss Environmental Division informed Malcolm Pirnie that the FTBL-14 landfill was being considered as a potential historical site by the New Mexico Environmental Department (NMED). The Conservation Branch submitted a report to the NMED demonstrating that the landfill should not be considered a historical site. The Conservation Branch would not approve the dig permit until the NMED responded to the report.

In November 2010, Malcolm Pirnie was informed that NMED determined that the landfill is not considered a historical site and the exploratory trenching and survey could proceed. Malcolm Pirnie finished obtaining the signatures required for approval of the dig permit application.

**Exploratory Trenching** - Following coordination of all subcontractors, the field work was performed on November 23 and 24, 2010. Sixteen test pits were excavated in the landfill and four in possible borrow areas using a backhoe. Figure 1 shows the location of FTBL-14 and the four potential borrow areas.

The sixteen landfill test pits extended to the bottom of waste (ranging from 3-13 feet below the top of cover) to assess the thickness of cover material and waste. Figure 2 shows the location of the test pits at the landfill. Malcolm Pirnie measured the cover thickness and waste thickness at each test pit using a tape measure from a secure point outside the test pit. Table 1 lists the cover thickness and waste thickness for each test pit. Malcolm Pirnie collected a total of eight samples of the landfill cover material for geotechnical analyses. Malcolm Pirnie transferred the samples from the backhoe bucket by shovel to five-gallon buckets and labeled each bucket.

Cover material and waste material were segregated during excavation of the test pits. Before moving to the next test pit, excavated material was placed back into the pits (waste material first then cover material), compacted, and graded using the backhoe's loader bucket to match existing grade. The test pits were compacted and graded prior to leaving the site for the day to ensure no open holes were left at the work site. In order to assess for the presence of suitable cover material near the landfill, Malcolm Pirnie received permission from Fort Bliss to excavate four test pits in nearby potential borrow area.

The four potential cover borrow areas are located to the north and west of the landfill and to the east of Elephant Mountain. Eight soil samples from borrow areas were collected using the backhoe bucket. The samples were transferred by shovel to five-gallon buckets. Four of the samples were collected from the depth interval of 0-1 feet below ground surface (bgs), and four samples were collected from the depth interval of 3-4 feet bgs. Before moving to the next borrow area test pit, the excavated material was placed back



into the pit, compacted, and graded using the backhoe loader bucket to match existing grade.

**Surveying** - The locations of the test pits were marked with stakes after each test pit was backfilled with excavated material. Land-Mark Surveying, a New Mexico-certified land surveyor, surveyed each location. Vertical and horizontal information was collected by the surveyor. The coordinates of each landfill test pit and borrow area test pit are listed in Table 1.

**Geotechnical Analyses** - The samples collected from the landfill cover material and the potential borrow areas were analyzed by Archana, Inc. of El Paso, Texas for the following geotechnical analyses:

- Moisture content,
- Bulk density,
- pH,
- Modified proctor,
- Particle-size analysis,
- Plasticity index, and
- Total organic content (TOC).

Geotechnical analytical results for the existing cover material and the potential cover material collected from borrow areas are summarized in Table 2 and Table 3, respectively.

**Volume Calculations** – Cover depth and waste depth determined from the exploratory trenching and horizontal and vertical survey information were used to generate a model of the FTBL-14 landfill in AutoCAD. Cover and waste volumes were then calculated using AutoCAD's 3D features, based on information developed in the landfill model.

## **Findings**

**Waste Thickness** - The waste thickness ranged from one foot to ten feet. The waste thickness is considered to be zero at the approximate landfill boundaries and increases gradually from north to south of the landfill. Cover and waste thickness measurements are listed in Table 1. Figure 3 illustrates the average approximated waste thickness throughout the landfill.

**Waste Volumes** – Based on the landfill model generated, the approximate volume of waste is 2,075 cubic yards.

**Cover Thickness** - The cover thickness ranged from two feet to seven feet. Cover and waste thickness measurements are listed in Table 1. Figure 4 illustrates the average approximated cover thickness throughout the landfill.

**Cover Volumes** - Based on the landfill model generated, the approximate volume of cover material is 2,178 cubic yards.

**Cover Material Characteristics** - The analytical results for the existing cover material are summarized in Table 2. The results indicate that the existing cover material is classified as non-plastic, silty sand with a moderate permeability and low moisture content. Complete analytical reports are attached to this letter report as Appendix B.

**Borrow Material Characteristics** - The analytical results for the potential borrow area soils are summarized in Table 3. The results indicate that the four potential borrow materials are classified as non-plastic, silt, silty sand, or poorly graded sand with silt. The potential borrow material collected at each of the four borrow areas also has a moderate permeability and a low moisture content.

### **Conclusions and Recommendations**

**Cover Material** – Based on geotechnical results, the soil characteristics of the existing cover material appeared favorable. While only one of the two tested existing cover soils exactly met the  $1 \times 10^{-5}$  cm/sec  $h_c$ , the other soil test appear close enough, that running the HELP Model with these geotech characteristics should demonstrate that the existing soils over the waste would be acceptable material after being compacted and adding sufficient additional material to reach the model's recommended cover thickness..

**Borrow Material** – Based on geotechnical results, the potential borrow material, collected from four locations, although close, does not have the exact hydraulic conductivity to meet the minimum cover thickness of 18 inches for a infiltration layer. Again they are close enough to the  $1 \times 10^{-5}$  cm/sec  $h_c$  to be excavated and move to the FTBL-014 site to provide the recommended depth over the existing material.

**Future Work** – Due to the fact that the existing cover and local borrow materials should be acceptable for an ET landfill cover material, one of the alternative closure options to be evaluated will be using them for an ET cover option. A second closure alternative to be evaluated against the ET cover will be the complete removal of the waste from the FTBL-14 landfill and disposal at a permitted municipal solid waste landfill.

(b) (6)

USACE - Tulsa District

November 21, 2011

Page 5 of 5

If you have any questions or concerns, please feel free to call me at (713) 960-7441.

Very truly yours,

MALCOLM PIRNIE, INC.

(b) (6)

Senior Project Manager

Attachments: Tables and Figures as stated

Attachment A- Field Notes

Attachment B- Geotechnical Analytical Laboratory Reports



**Table 1:**  
**Test Pit Locations, Cover Thickness, and Waste Thickness**

Test Pit	Elevation (feet)	Coordinates		Cover Thickness (feet)	Waste Thickness (feet)
		North	East		
TP-1	4206.99	506489.80	1671024.83	6	3
TP-2	4207.39	506501.28	1671009.55	7	1
TP-3	4204.89	506442.45	1671014.43	5.5	2.5
TP-4	4205.44	506457.86	1670997.66	2	1
TP-5	4203.71	506407.59	1671003.98	6	4
TP-6	4203.34	506420.73	1670984.96	2	1
TP-7	4201.72	506397.66	1670977.00	6	6
TP-8	4201.94	506357.25	1670995.14	6	3
TP-9	4201.29	506363.57	1670957.92	4	1
TP-10	4200.17	506344.08	1670970.69	5	5
TP-11	4202.22	506307.24	1670985.17	6.5	6.5
TP-12	4200.36	506315.66	1670946.82	3	7
TP-13	4200.30	506271.89	1670959.53	2	8
TP-14	4199.63	506269.80	1670933.25	2	10
TP-15	4200.17	506235.92	1670942.95	4	6
TP-16	4199.26	506224.10	1670923.03	2	8
BP-1	5206.14	506603.79	1670775.33	NA	NA
BP-2	4251.59	507578.96	1671300.92	NA	NA
BP-3	4203.27	507034.48	1675103.20	NA	NA
BP-4	4185.88	505918.69	1674884.71	NA	NA

**Notes:**

Coordinates are New Mexico State Plane, Central Zone (NAD 83 Datum) and are in U.S. Survey Feet.

BP = Borrow Area Pit

NA = Not applicable - no cover or waste present at borrow areas

TP = Landfill Test Pit

**Table 2**  
**Landfill Cover Geotechnical Results**

Test Pit	Classification	Moisture Content (%)	Bulk Specific Gravity	pH	Modified Proctor		Plasticity Index	TOC (%)	Remolded Falling Head Permeability (cm/sec)
					Maximum Dry Density (PCF)	Optimum Moisture (%)			
TP-1	SM	2.4	2.382	7.89	129.5	9.0	NP	0.7	--
TP-4	SM	2.7	2.416	7.89	131.0	8.0	NP	0.8	9.83x10 <sup>-5</sup>
TP-5	SM	2.1	2.454	7.94	132.4	7.5	NP	0.8	--
TP-7	SM	2.5	2.451	7.95	133.0	8.5	NP	0.8	--
TP-10	SM	3.1	2.458	7.96	128.5	9.5	NP	0.9	--
TP-12	SM	2.0	1.475	7.96	131.5	8.9	NP	0.7	--
TP-13	SM	1.8	2.453	7.98	130.0	7.9	NP	0.7	3.44x10 <sup>-5</sup>
TP-16	SM	2.5	2.502	7.95	130.5	8.5	NP	0.6	--
<b>Average</b>		2.4	2.324	7.94	130.8	8.5	NP	0.8	NA

**Notes:**

NA = Not Applicable

NP = Non-Plastic

PCF = Pounds per cubic foot

TOC = Total Organic Content

SM = Silty Sand

-- = Test pit samples not analyzed for remolded falling head permeability

**Table 3**  
**Borrow Area Geotechnical Results**

Test Pit	Classification	Moisture Content (%)	Bulk Specific Gravity	pH	Modified Proctor		Plasticity Index	TOC (%)	Remolded Failing Head Permeability (cm/sec)
					Maximum Dry Density (PCF)	Optimum Moisture (%)			
BP-1(0-1)	SP-SM	1.6	2.528	7.98	127.3	9.5	NP	0.5	4.79x10 <sup>-5</sup>
BP-1(3-4)	SP-SM	3.5	2.456	7.85	123.5	9.1	NP	0.4	--
BP-2(0-1)	ML	1.9	2.483	8.27	122.2	9.3	NP	0.8	--
BP-2(3-4)	SM	1.7	2.470	8.26	121.8	11.5	NP	0.7	2.31x10 <sup>-5</sup>
BP-3(0-1)	SP-SM	1.3	2.525	8.27	122.8	9.5	NP	0.7	1.66x10 <sup>-3</sup>
BP-3(3-4)	SM	0.2	2.493	8.21	125.5	8.0	NP	0.7	--
BP-4(0-1)	SM	2.0	2.512	8.25	128.4	7.5	NP	0.7	--
BP-4(3-4)	SM	1.6	2.398	7.95	131.0	9.0	NP	0.5	6.52x10 <sup>-5</sup>
<b>Average</b>		<b>1.7</b>	<b>2.483</b>	<b>8.13</b>	<b>125.3</b>	<b>9.2</b>	<b>NP</b>	<b>0.6</b>	<b>NA</b>

**Notes:**

NA = Not Applicable

NP = Non-Plastic

ML = Silt

PCF = Pounds per cubic foot

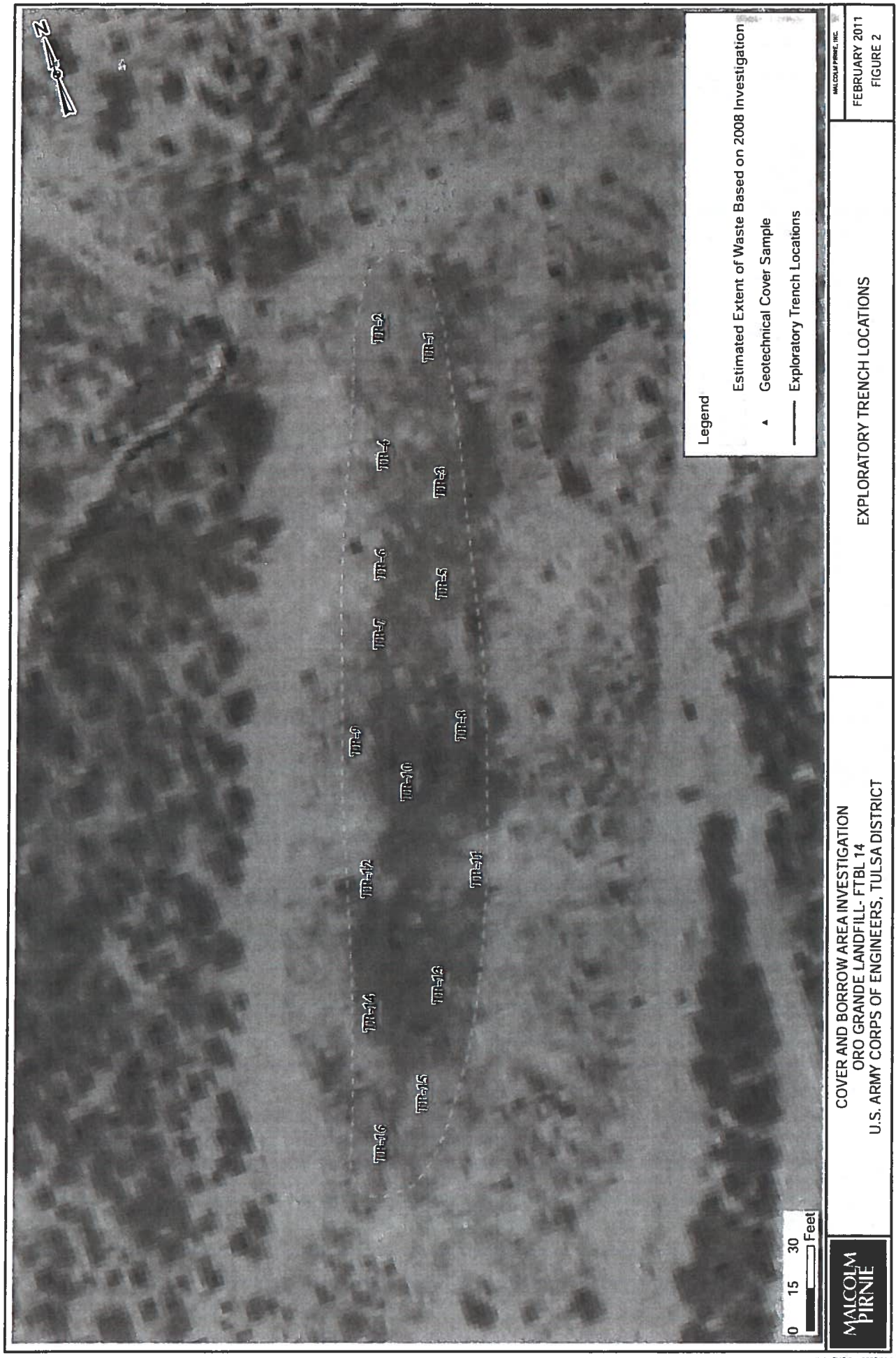
SM = Silty Sand

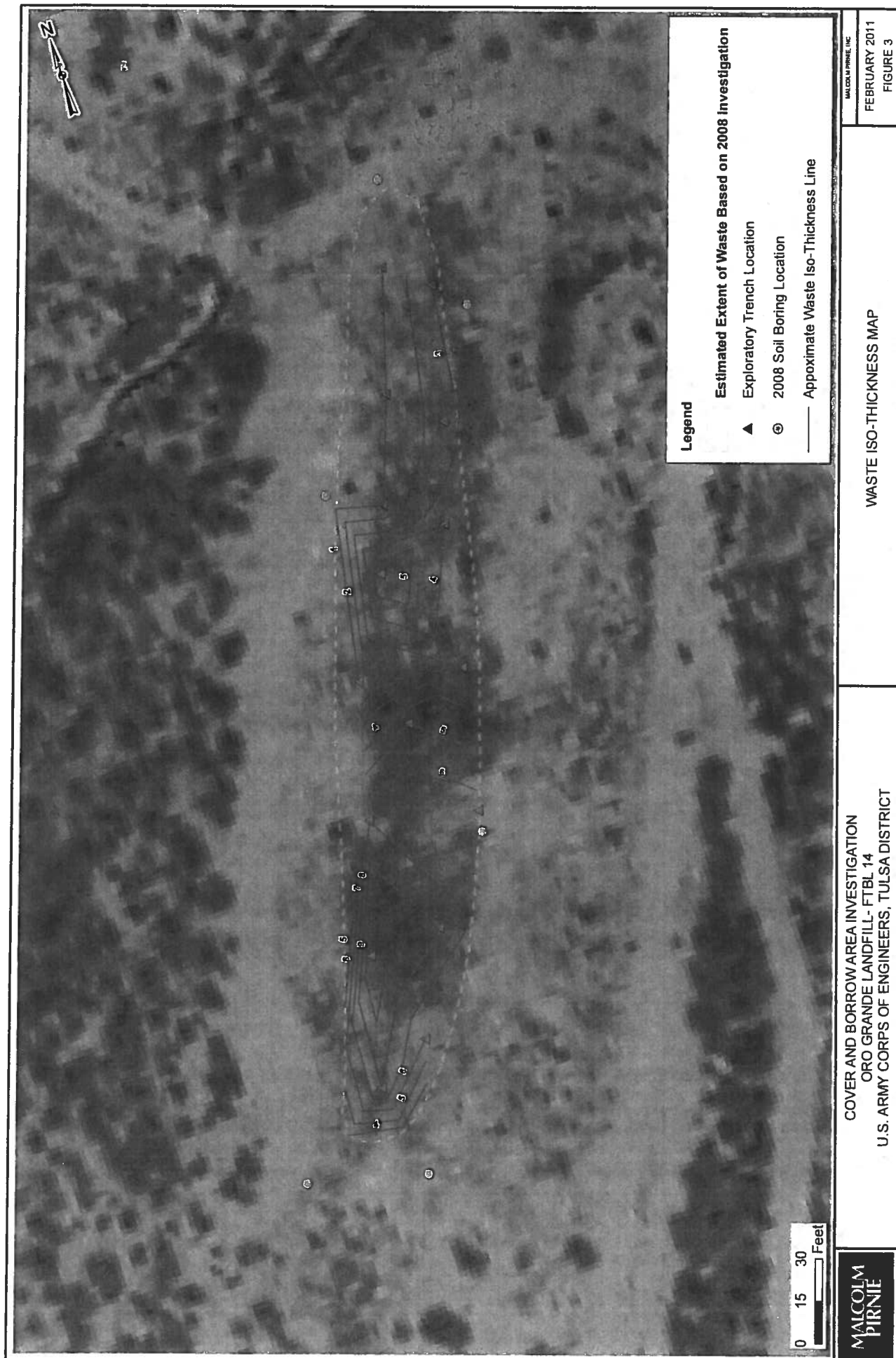
SP-SM = Poorly Graded Sand with Silt

TOC = Total Organic Content

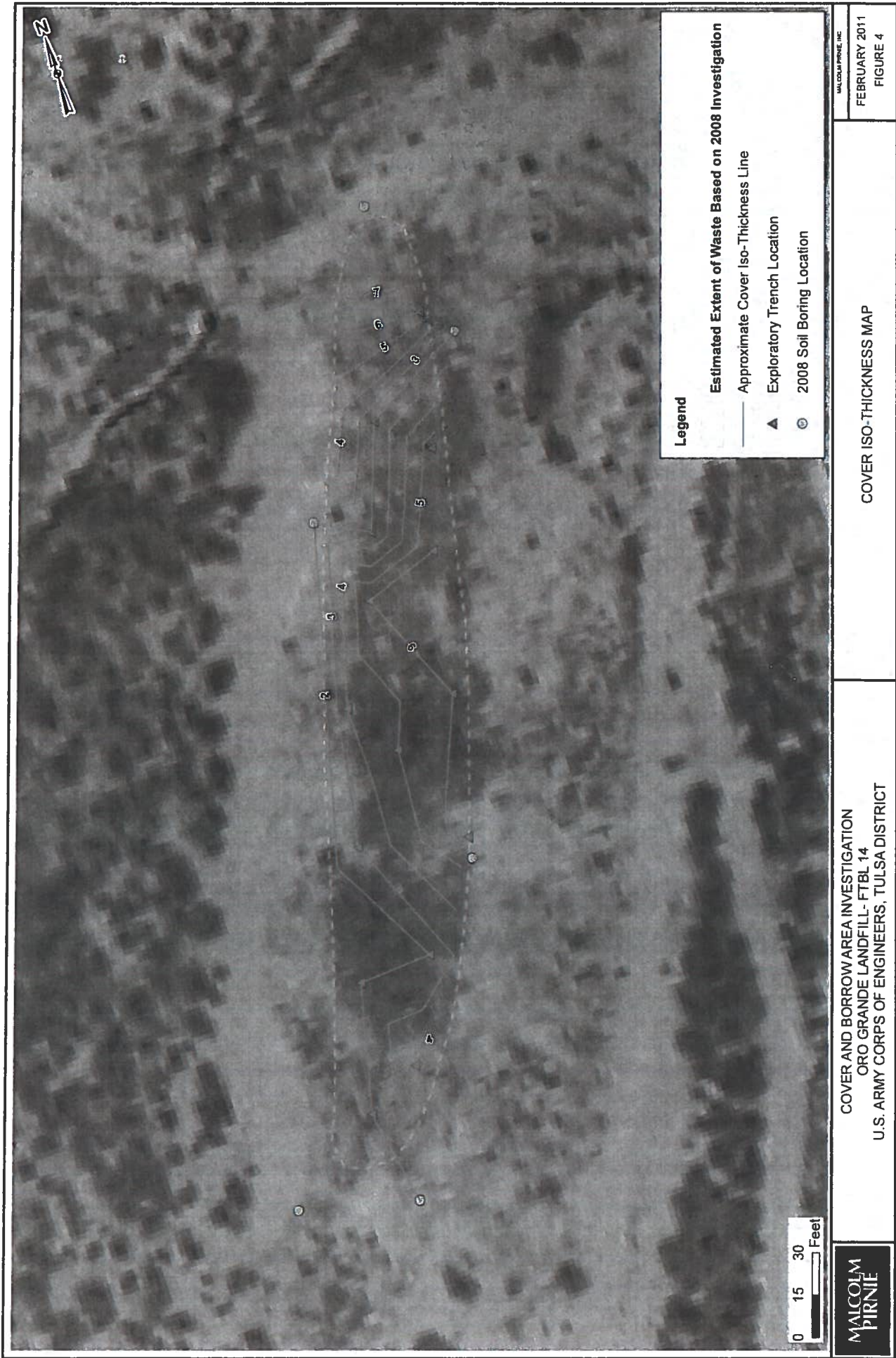
-- = Borrow Area samples not analyzed for remolded failing head permeability







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Map Document (3/5/15, ResourcesStandards, G:\Data\MapTemplates\015, TEMPLATES, 20051117, Landscape.mxd)

## DAILY REPORT

Project No.: 5285027  
Contract: W912BV-04-D-2008  
Task Order 0007, Modification 3  
Location: Oro Grande Landfill (FTRL-14)

Date: November 23, 2010  
Weather: am: Clear  
pm: Windy  
Temperature: am: -45 °F pm: -65 °F

Contractor and Personnel:	Work Performed:
Joe Baca, Malcolm Pirnie Will Henson, Corner of the Sun Back-Hoe Operator, Corner of the Sun	Excavated 8 test pits at the landfill. During the excavation of TP-7 it was determined that the back-hoe could not reach the bottom of the waste. Will began efforts to have a new backhoe on-site for the next days work. <del>Under the pits made depth to bottom of waste</del> Cover samples were collected from the following excavations:
Material Received:	TP-1: 2 - 5gallon Buckets TP-4: 3 - 5gallon Buckets TP-5: 2 - 5gallon Buckets TP-7: 2 - 5gallon Buckets
Collected Soil Samples	Additionally, depth of cover and depth to bottom of waste was measured for the above pits and the following:
	TP-2 TP-3 TP-6 TP-9
Equipment:	
Ditch Witch Tracked Back- Hoe	Work Started: 8:00 AM Work Ended: 16:30 PM
	Sketch of Work/Comments:
	New back-hoe to be on-site for November 24, 2010

Visitors: None

c: Field Office  
Project File

Signature: Dale Baca

## DAILY REPORT

Project No.: 5285-027  
Contract: WA12BV-04-D-2008  
TO 0007, Mod 3  
Location: Do Grande Landfill (FBI-14)

Date: November 24, 2010  
Weather: am: Clear  
pm: Breezy  
Temperature: am: 45°F pm: 65°F

Contractor and Personnel:	Work Performed:
Joe Baca, Malcolm Pirnie Will Herron, Corner of the Sun Back-Hoe Operator, Corner of the Sun	TP-7 was excavated again to determine the bottom of waste with the larger back-hoe. The final 8 Test pits were excavated and cover depth and waste depth were determined. The four borrow areas were excavated as well.
	Cave samples were collected from the following test pits:
	TP-10: 2-5 gal. buckets
	TP-12: 2-5 gal. buckets
	TP-13: 3-5 gal. buckets
	TP-16: 2-5 gal. buckets
	Samples were collected from the borrow areas as follows:
	BP1(0-1): 3-5 gal. buckets BP3(0-1): 3-5 gal. buckets
	BP1(3-4): 2-5 gal. buckets BP3(3-4): 2-5 gal. buckets
	BP2(0-1): 2-5 gal. buckets BP4(0-1): 2-5 gal. buckets
	BP2(3-4): 3-5 gal. buckets BP4(3-4): 3-5 gal. buckets
Equipment:	Depth to cover and depth to waste bottom measured at the test pits listed above and at TP-8, TP-11, TP-14, and TP-15
Back-Hoe From United Rental	
	Sketch of Work/Comments:
	New, Larger back-hoe obtained for excavations Work Start: 7:00 AM Work End: 16:30 PM

Visitors: NONE



**Archana USA, Inc.**

Environmental and Geotechnical Engineering Consultants

**REMOLDED FALLING HEAD PERMEABILITY  
(ASTM D-5084)**

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901

Attn: (b) (6)

Date: 01/08/11

Archana Lab No: 12524

Technician: (b) (6)

Date Sampled: 12/01/10

Project No.: AJC-10-044  
Project: FTBL-14 Land Fill

Sample ID	Test	Procedure	Test Date	Result as (cm/second)
BP-1 (0-1)	REMOLDED FALLING HEAD PERMEABILITY	ASTM D5084	12-29-2010	4.79E-05
BP-2 (3-4)	REMOLDED FALLING HEAD PERMEABILITY	ASTM D5084	01-02-2011	2.31E-05
BP-3 (0-1)	REMOLDED FALLING HEAD PERMEABILITY	ASTM D5084	12-30-2010	1.66E-03
TP-4 GT	REMOLDED FALLING HEAD PERMEABILITY	ASTM D5084	01-04-2011	9.83E-06
BP-4 (3-4 ft)	REMOLDED FALLING HEAD PERMEABILITY	ASTM D5084	12-27-2010	6.52E-05
TP-13 GT	REMOLDED FALLING HEAD PERMEABILITY	ASTM D5084	12-23-2010	3.44E-05

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Ph.D., P.E.

President

01/08/11

Date

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## PH ANALYSIS (ASTM D-4972/EPA150.1)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901

Attn: [REDACTED]

Date: 12/18/10  
Archana Lab No: 12524  
Technician: [REDACTED]  
Date Sampled: 12/01/10

Project No.: AJC-10-044  
Project: FTBL-14 Land Fill

### LABORATORY RESULTS

Sample ID	Analysis	Results	Unit	RL	Method	Date analyzed	Analyst
TP-1GT-1	pH	7.89	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-4GT-2	pH	7.89	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-5GT-3	pH	7.94	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-7GT-4	pH	7.95	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-10GT-5	pH	7.96	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-12GT-6	pH	7.96	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-13GT-7	pH	7.98	SI Units	1	EPA 150.1	12/18/10	J.L.
TP-16GT-8	pH	7.95	SI Units	1	EPA 150.1	12/18/10	J.L.

Sample ID	Analysis	Results	Unit	RL	Method	Date analyzed	Analyst
BP-1(0-1)-9	pH	7.98	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-1(3-4)-10	pH	7.85	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-2(0-1)-11	pH	8.27	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-2(3-4)-12	pH	8.26	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-3(0-1)-13	pH	8.27	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-3(3-4)-14	pH	8.21	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-4(0-1)-15	pH	8.25	SI Units	1	EPA 150.1	12/18/10	J.L.
BP-4(3-4)-16	pH	7.95	SI Units	1	EPA 150.1	12/18/10	J.L.

RL: Reporting Limit

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Ph.D., P.E.

President

12/18/10

Date

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## TOTAL ORGANIC CONTENT (ASTM D-2974)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901  
Attn: (b) (6)

Date: 12/18/10  
Archana Lab No: 12524  
Technician: (b) (6)  
Date Sampled: 12/01/10

Project No.: AJC-10-044  
Project: FTBL-14 Land Fill

### LABORATORY RESULTS

Sample ID	Analysis	Results (%)	Method	Date Analyzed	Analyst
TP-1GT-1	TOC	0.7	ASTM D2974	12/23/10	J.L
TP-4GT-2	TOC	0.8	ASTM D2974	12/23/10	J.L
TP-5GT-3	TOC	0.8	ASTM D2974	12/23/10	J.L
TP-7GT-4	TOC	0.8	ASTM D2974	12/23/10	J.L
TP-10GT-5	TOC	0.9	ASTM D2974	12/23/10	J.L
TP-12GT-6	TOC	0.7	ASTM D2974	12/23/10	J.L
TP-13GT-7	TOC	0.7	ASTM D2974	12/23/10	J.L
TP-16GT-8	TOC	0.6	ASTM D2974	12/23/10	J.L

Sample ID	Analysis	Results (%)	Method	Date Analyzed	Analyst
BP-1(0-1)-9	TOC	0.5	ASTM D2974	12/23/10	J.L
BP-1(3-4)-10	TOC	0.4	ASTM D2974	12/23/10	J.L
BP-2(0-1)-11	TOC	0.8	ASTM D2974	12/23/10	J.L
BP-2(3-4)-12	TOC	0.7	ASTM D2974	12/23/10	J.L
BP-3(0-1)-13	TOC	0.7	ASTM D2974	12/23/10	J.L
BP-3(3-4)-14	TOC	0.7	ASTM D2974	12/23/10	J.L
BP-4(0-1)-15	TOC	0.7	ASTM D2974	12/23/10	J.L
BP-4(3-4)-16	TOC	0.5	ASTM D2974	12/23/10	J.L

RL: Reporting Limit

TOC: Total Organic Content

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Ph.D., P.E.  
President

01/08/11  
Date

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE CONTENT (ASTM D 2216)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901

Attn: (b) (6)

Date: 12/18/10

Archana Lab No: 12524

Technician: (b) (6)

Date Sampled: 12/01/10

Project No.: AIC-10-044

Project: FTBL-14 Land Fill

### LABORATORY RESULTS

Sample ID	Moisture Content
TP-1GT-1	2.4
TP-4GT-2	2.7
TP-5GT-3	2.1
TP-7GT-4	2.5
TP-10GT-5	3.1
TP-12GT-6	2.0
TP-13GT-7	1.8
TP-16GT-8	2.5

Sample ID	Moisture Content
BP-1(0-1)-9	1.6
BP-1(3-4)-10	3.5
BP-2(0-1)-11	1.9
BP-2(3-4)-12	1.7
BP-3(0-1)-13	1.3
BP-3(3-4)-14	0.2
BP-4(0-1)-15	2.0
BP-4(3-4)-16	1.6

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President

12/18/10

Date

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-1  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: TP-1GT, Silty Sand w/Gravel, Calcareous Indurated (Caliche) Nodules, Non-Plastic, Brown

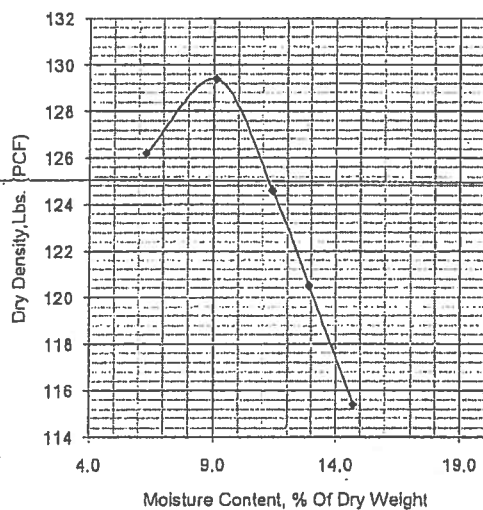
Attn: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	129.5
Optimum Moisture:	9.0
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
126.2	6.3
129.4	9.1
124.6	11.4
120.5	12.9
115.4	14.7



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	82	
3/4"	86	
3/8"	74	
No. 4	67	
No. 8	60	
No. 10	58	
No. 16	53	
No. 30	50	
No. 40	49	
No. 50	45	
No. 100	27	
No. 200	15.1	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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h.D., P.E.

President

12/09/10

DATE



# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/19/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-2  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: TP-4GT, Silty Sand some Gravel, Non-Plastic, Red Brown

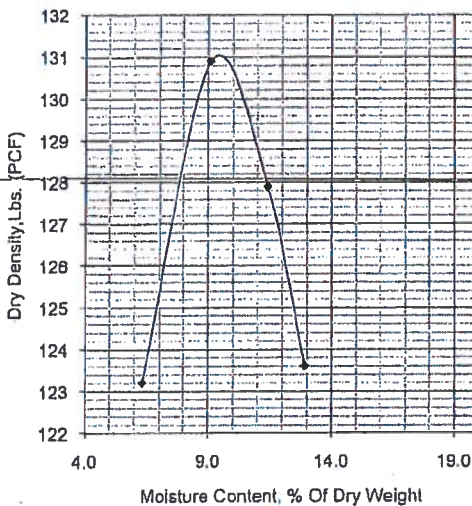
Attn: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	131.0
Optimum Moisture:	8.0
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
123.2	6.3
130.9	9.1
127.9	11.4
123.6	12.9



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	82	
3/4"	100	
1/2"	97	
3/8"	95	
No. 4	90	
No. 8	81	
No. 10	79	
No. 16	72	
No. 30	66	
No. 40	64	
No. 50	58	
No. 100	36	
No. 200	19.2	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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TX LICENSE#

h.D., P.E.

President

12/30/10

DATE

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-3  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

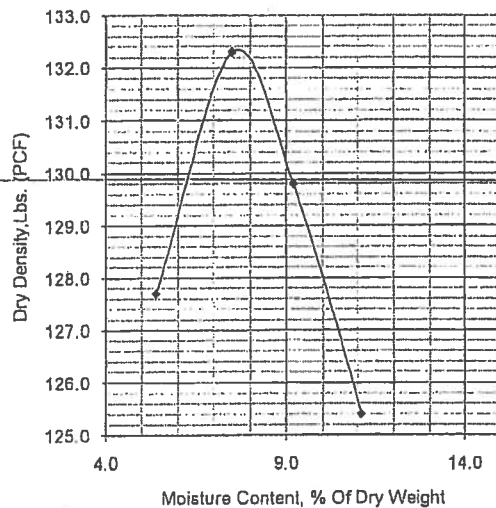
Material: TP-5GT, Silty Sand some Gravel, Non-Plastic, Light Brown

Attn: (b) (6) Source: Sampled by Client

### Test Data:

Maximum Dry Density:	132.4
Optimum Moisture:	7.5
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
127.7	5.4
132.3	7.5
129.8	9.2
125.4	11.1



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	94	
1/2"	92	
3/8"	87	
No. 4	78	
No. 8	69	
No. 10	67	
No. 16	61	
No. 30	57	
No. 40	55	
No. 50	50	
No. 100	30	
No. 200	14.8	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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President

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DATE



# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-4  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

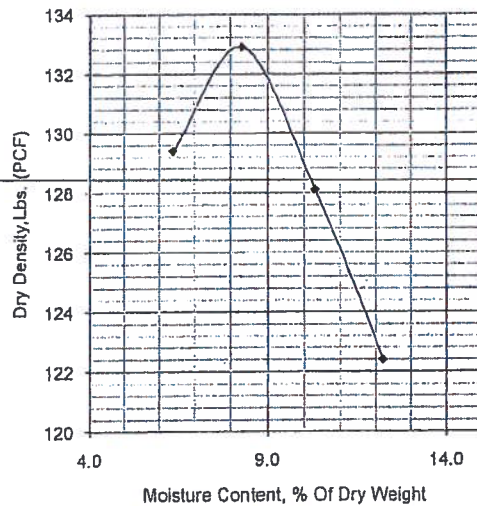
Material: TP-7GT, Silty Sand some Gravel, Non-Plastic, Light Brown

Attn: [REDACTED] Source: Sampled by Client

### Test Data:

Maximum Dry Density:	133.0
Optimum Moisture:	8.5
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV PI: NP

Dry Density	Moisture %
129.4	6.4
132.9	8.3
128.1	10.3
122.4	12.2



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	97	
3/4"	92	
3/8"	88	
No. 4	80	
No. 8	70	
No. 10	68	
No. 16	61	
No. 30	57	
No. 40	55	
No. 50	50	
No. 100	28	
No. 200	14.3	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-5  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: TP-10GT, Silty Sand w/Gravel, Calcareous Indurated (Caliche) Nodules, Non-Plastic, Light Brown

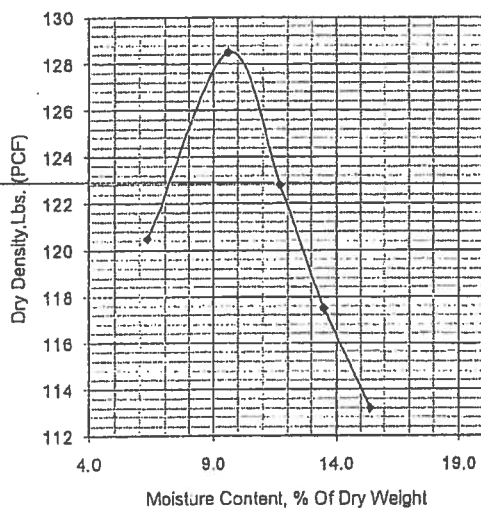
Attr: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	128.5
Optimum Moisture:	9.5
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
120.5	6.3
128.5	9.6
122.8	11.7
117.5	13.5
113.2	15.4



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	87	
3/8"	81	
No. 4	74	
No. 8	66	
No. 10	64	
No. 16	59	
No. 30	58	
No. 40	54	
No. 50	49	
No. 100	28	
No. 200	15.2	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-6  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: TP-12GT, Silty Sand some Gravel, Non-Plastic, Red-Brown

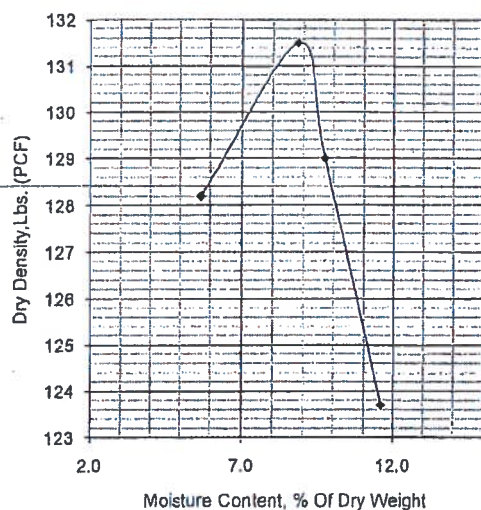
Attn: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	131.5
Optimum Moisture:	8.9
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV PI: NP

Dry Density	Moisture %
128.2	5.7
131.5	8.8
129.0	9.7
123.7	11.6



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	98	
1/2"	96	
3/8"	92	
No. 4	83	
No. 8	72	
No. 10	70	
No. 16	63	
No. 30	59	
No. 40	56	
No. 50	51	
No. 100	28	
No. 200	13.7	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-7  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

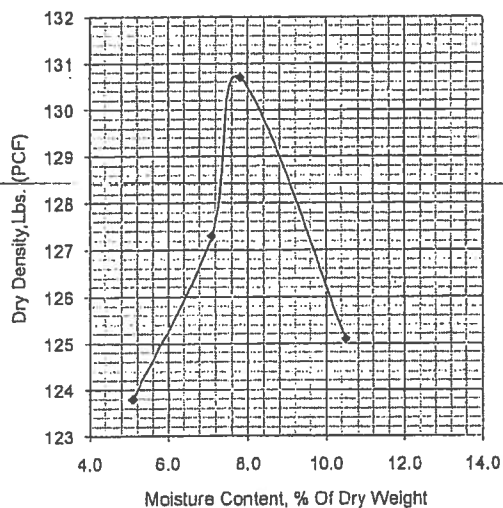
Material: TP-13GT, Silty Sand some Gravel, Non-Plastic, Light Brown

Attr: (b) (6) Source: Sampled by Client

### Test Data:

Maximum Dry Density:	130.0
Optimum Moisture:	7.9
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
123.8	5.1
127.3	7.1
130.7	7.8
125.1	10.5



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
3/8"	90	
No. 4	81	
No. 8	73	
No. 10	72	
No. 16	67	
No. 30	64	
No. 40	61	
No. 50	56	
No. 100	33	
No. 200	15.9	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-8  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

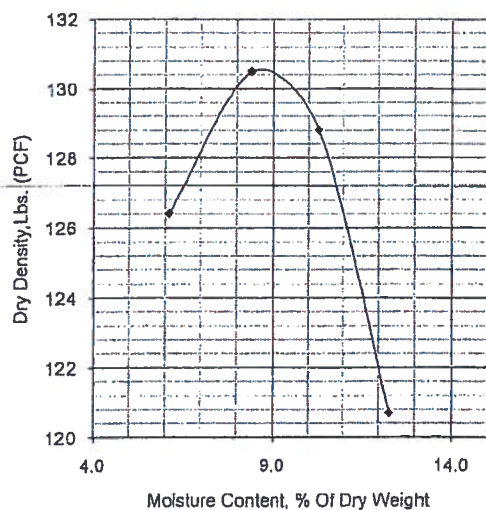
Material: TP-16GT, Silty Sand some Gravel, Non-Plastic, Light Brown

Attn: [REDACTED] Source: Sampled by Client

### Test Data:

Maximum Dry Density:	130.5
Optimum Moisture:	8.5
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV PI: NP

Dry Density	Moisture %
126.4	6.1
130.5	8.4
128.8	10.3
120.7	12.3



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	97	
3/4"	94	
3/8"	90	
No. 4	83	
No. 8	75	
No. 10	73	
No. 16	69	
No. 30	66	
No. 40	64	
No. 50	58	
No. 100	28	
No. 200	12.1	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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President

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## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-9  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: BP-1 (0-1), Poorly Graded Sand w/Silt & Trace Gravel, Non-Plastic, Brown

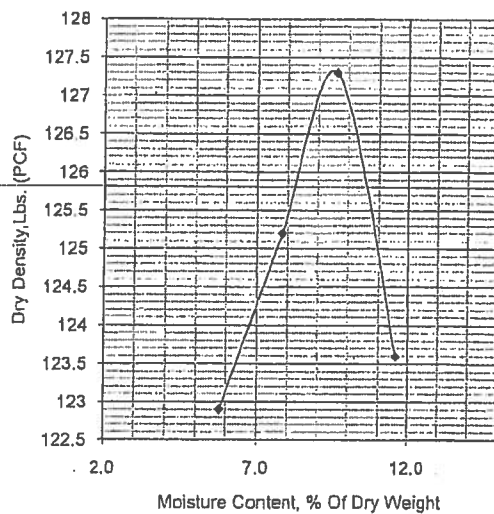
Attn: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	127.3
Optimum Moisture:	9.5
Classification:	SP-SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
122.9	5.8
125.2	7.8
127.3	9.6
123.6	11.6



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
1/2"	97	
3/8"	93	
No. 4	86	
No. 8	78	
No. 10	77	
No. 16	72	
No. 30	69	
No. 40	67	
No. 50	60	
No. 100	30	
No. 200	11.6	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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# Archana USA, Inc.

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## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-10  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: BP-1 (3-4), Poorly Graded Sand w/Silt & Trace Gravel, Non-Plastic, Brown

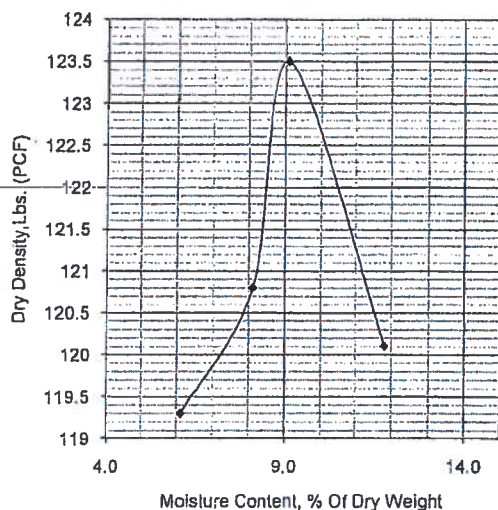
Attn: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	123.5
Optimum Moisture:	9.1
Classification:	SP-SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
119.3	6.1
120.8	8.1
123.5	9.1
120.1	11.8



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
1/2"	100	
3/8"	97	
No. 4	95	
No. 8	93	
No. 10	92	
No. 16	90	
No. 30	87	
No. 40	84	
No. 50	72	
No. 100	26	
No. 200	7.5	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-11  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

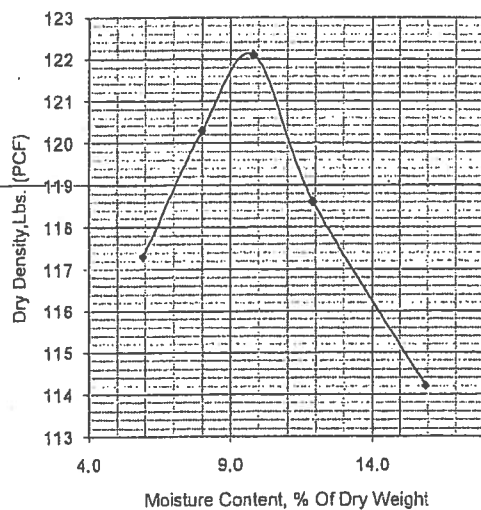
Material: BP-2 (0-1), Poorly Graded Sand w/Silt, Non-Plastic, Light Brown

Attn: [REDACTED] Source: Sampled by Client

### Test Data:

Maximum Dry Density:	122.2
Optimum Moisture:	9.3
Classification:	ML
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
117.3	5.9
120.3	8.0
122.1	9.8
118.6	11.9
114.2	15.9



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
1/2"	100	
3/8"	100	
No. 4	100	
No. 8	99	
No. 10	98	
No. 16	98	
No. 30	97	
No. 40	95	
No. 50	87	
No. 100	94	
No. 200	91.2	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-12  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

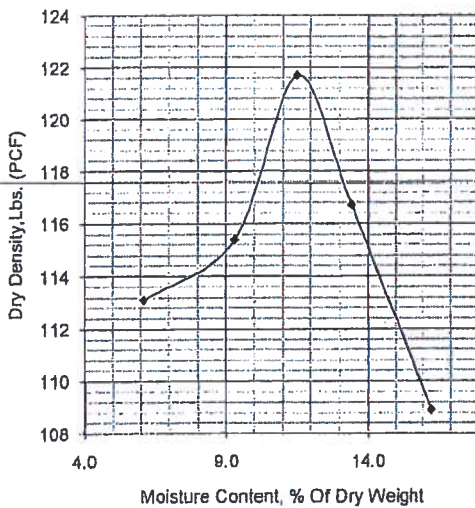
Material: BP-2 (3-4), Silty Sand, Non-Plastic, Brown

Attn: (b) (6) Source: Sampled by Client

### Test Data:

Maximum Dry Density:	121.8
Optimum Moisture:	11.5
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
113.1	6.1
115.4	9.3
121.7	11.5
116.7	13.4
108.9	16.3



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
1/2"	100	
3/8"	100	
No. 4	100	
No. 8	94	
No. 10	93	
No. 16	92	
No. 30	91	
No. 40	89	
No. 50	81	
No. 100	73	
No. 200	13.4	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL

(ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-13  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

Material: BP-3 (0-1), Poorly Graded Sand w/Silt, Non-Plastic, Light Brown

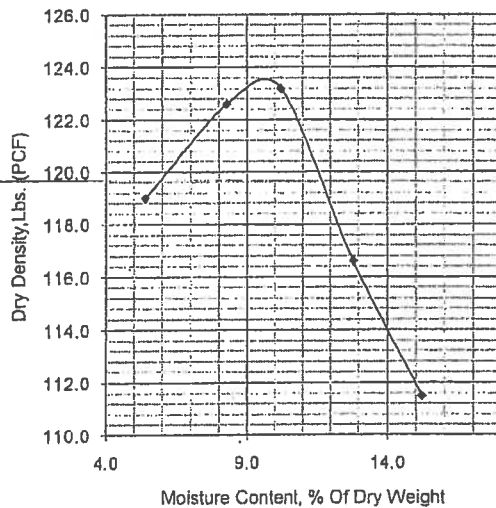
Attn: (b) (6)

Source: Sampled by Client

### Test Data:

Maximum Dry Density:	122.8
Optimum Moisture:	9.5
Classification:	SP-SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
119.0	5.4
122.6	8.3
123.2	10.2
116.6	12.8
111.5	15.2



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
1/2"	100	
3/8"	100	
No. 4	100	
No. 8	97	
No. 10	98	
No. 16	95	
No. 30	92	
No. 40	89	
No. 50	80	
No. 100	38	
No. 200	14.7	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-14  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

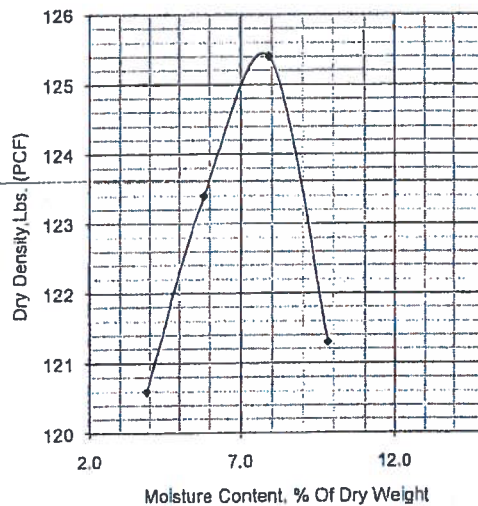
Material: BP-3 (3-4), Silty Sand, Trace Gravel, Non-Plastic, Light Brown

Attn: Mr. Garrett Ferguson Source: Sampled by Client

### Test Data:

Maximum Dry Density:	125.5
Optimum Moisture:	8.0
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV PI: NP

Dry Density	Moisture %
120.6	3.9
123.4	5.8
125.4	7.9
121.3	9.8



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	98	
1/2"	98	
3/8"	98	
No. 4	98	
No. 8	97	
No. 10	97	
No. 16	97	
No. 30	95	
No. 40	92	
No. 50	83	
No. 100	41	
No. 200	16.9	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/9/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-15  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

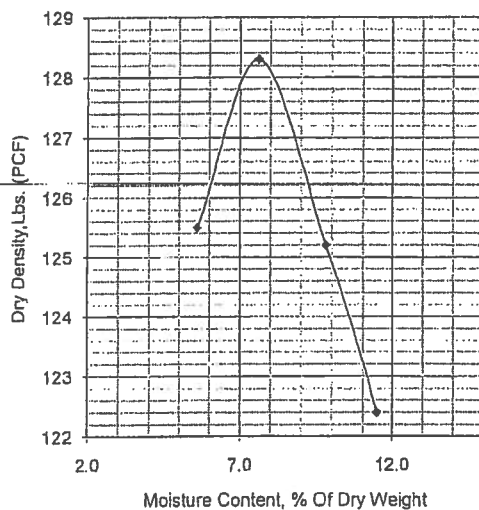
Material: BP-4 (0-1), Silty Sand, Trace Gravel, Non-Plastic, Light Brown

Attn: (b) (6) Source: Sampled by Client

### Test Data:

Maximum Dry Density:	128.4
Optimum Moisture:	7.5
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV PI: NP

Dry Density	Moisture %
125.5	5.6
128.3	7.6
125.2	9.8
122.4	11.5




### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	100	
3/4"	100	
1/2"	100	
3/8"	99	
No. 4	97	
No. 8	95	
No. 10	95	
No. 16	92	
No. 30	86	
No. 40	82	
No. 50	73	
No. 100	38	
No. 200	16.5	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557


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President

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# Archana USA, Inc.

Environmental and Geotechnical Engineering Consultants

## MOISTURE - DENSITY RELATIONSHIP OF SOIL (ASTM D1557)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street  
El Paso, Texas 79901

Date: 12/20/2010  
Archana Project No.: J-10-044  
Archana Lab No.: 12524-16  
Technician: Enrique Acuna  
Date Sampled: 12/1/2010

Project: FTBL-14 Land Fill

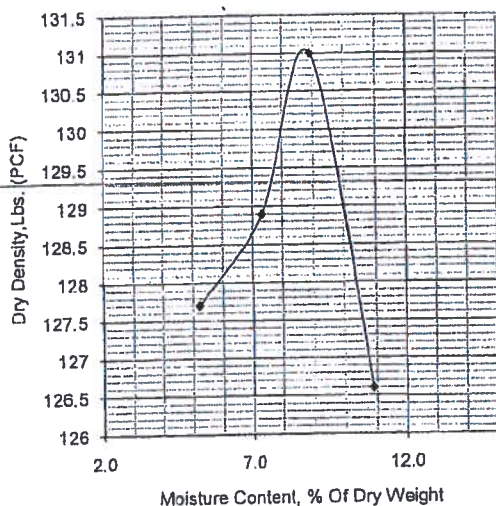
Material: BP-4 (3-4), Silty Sand w/Gravel, Non-Plastic, Brown

Attn: (b) (6) Source: Sampled by Client

### Test Data:

Maximum Dry Density:	131.0
Optimum Moisture:	9.0
Classification:	SM
Atterberg Limits:	
LL: NV	PL: NV
	PI: NP

Dry Density	Moisture %
127.7	5.2
128.9	7.3
131.0	8.9
126.6	10.9



### Grain Size Analysis

Sieve Size	% Passing	Specifications
2"	100	
1 1/2"	100	
1"	96	
3/4"	96	
1/2"	95	
3/8"	94	
No. 4	89	
No. 8	85	
No. 10	84	
No. 16	80	
No. 30	74	
No. 40	72	
No. 50	59	
No. 100	40	
No. 200	19.1	

Report Procedures Include: ASTM D-4318, C-117, C-137, D-1557

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12/20/10  
DATE

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**Archana USA, Inc.**

Environmental and Geotechnical Engineering Consultants

**SPECIFIC GRAVITY OF FINE AGGREGATE**

(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-1

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: TP-1GT

Bulk Specific Gravity: 2.382

Bulk Specific Gravity (SSD Basis): 2.451

Apparent Specific Gravity: 2.557

Absorption Percent: 2.87%

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Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-2

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: TP-4GT

Bulk Specific Gravity: 2.416

Bulk Specific Gravity (SSD Basis): 2.483

Apparent Specific Gravity: 2.589

Absorption Percent: 2.76%

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Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-3

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: TP-5GT

Bulk Specific Gravity: 2.454

Bulk Specific Gravity (SSD Basis): 2.521

Apparent Specific Gravity: 2.629

Absorption Percent: 2.71%

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Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-4

Technician: [REDACTED]

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: TP-7GT

Bulk Specific Gravity: 2.451

Bulk Specific Gravity (SSD Basis): 2.502

Apparent Specific Gravity: 2.583

Absorption Percent: 2.08%

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(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901  
Attn: [REDACTED]

Date: 1/8/2010  
Archana Lab No.: 12524-5  
Technician: (b) (6)  
Date Sampled: 12/1/2010

Archana Project No.: J-10-044  
Project: FTBL-14 Land Fill  
Sample Identification No.: TP-10GT

Bulk Specific Gravity: 2.458  
Bulk Specific Gravity (SSD Basis): 2.527  
Apparent Specific Gravity: 2.639

Absorption Percent: 2.80%

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(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-6

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: TP-12GT

Bulk Specific Gravity: 1.475

Bulk Specific Gravity (SSD Basis): 1.689

Apparent Specific Gravity: 1.877

Absorption Percent: 14.5%

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(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-7

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: TP-13GT

Bulk Specific Gravity: 2.453

Bulk Specific Gravity (SSD Basis): 2.511

Apparent Specific Gravity: 2.604

Absorption Percent: 2.38%

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**Client:** Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

**Attn:** (b) (6)

**Date:** 1/8/2010

**Archana Lab No.:** 12524-8

**Technician:** [REDACTED]

**Date Sampled:** 12/1/2010

**Archana Project No.:** J-10-044

**Project:** FTBL-14 Land Fill

**Sample Identification No.:** TP-16GT

**Bulk Specific Gravity:** 2.502

**Bulk Specific Gravity (SSD Basis):** 2.581

**Apparent Specific Gravity:** 2.715

**Absorption Percent:** 3.13%

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Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-9

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: BP-1 (0-1)

Bulk Specific Gravity: 2.528

Bulk Specific Gravity (SSD Basis): 2.585

Apparent Specific Gravity: 2.681

Absorption Percent: 2.25%

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Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901  
Attn: (b) (6)

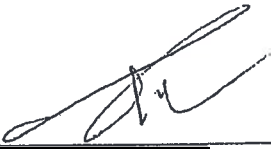
Date: 1/8/2010  
Archana Lab No.: 12524-10  
Technician: [REDACTED]  
Date Sampled: 12/1/2010

Archana Project No.: J-10-044  
Project: FTBL-14 Land Fill  
Sample Identification No.: BP-1 (3-4)

Bulk Specific Gravity: 2.456  
Bulk Specific Gravity (SSD Basis): 2.532  
Apparent Specific Gravity: 2.657

Absorption Percent: 3.07%

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(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: [REDACTED]

Date: 1/8/2010

Archana Lab No.: 12524-11

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: BP-2 (0-1)

Bulk Specific Gravity: 2.483

Bulk Specific Gravity (SSD Basis): 2.551

Apparent Specific Gravity: 2.666

Absorption Percent: 2.77%

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(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901  
Attn: (b) (6)

Date: 1/8/2010  
Archana Lab No.: 12524-12  
Technician: (b) (6)  
Date Sampled: 12/1/2010

Archana Project No.: J-10-044  
Project: FTBL-14 Land Fill  
Sample Identification No.: BP-2 (3-4)

Bulk Specific Gravity: 2.47  
Bulk Specific Gravity (SSD Basis): 2.533  
Apparent Specific Gravity: 2.636

Absorption Percent: 2.54%

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Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901  
Attn: (b) (6)

Date: 1/8/2010  
Archana Lab No.: 12524-13  
Technician: (b) (6)  
Date Sampled: 12/1/2010

Archana Project No.: J-10-044  
Project: FTBL-14 Land Fill  
Sample Identification No.: BP-3 (0-1)

Bulk Specific Gravity: 2.525  
Bulk Specific Gravity (SSD Basis): 2.573  
Apparent Specific Gravity: 2.651

Absorption Percent: 1.87%

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**SPECIFIC GRAVITY OF FINE AGGREGATE**  
(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.  
211 N. Florence Street, Ste. 202  
El Paso, Texas 79901  
Attn: [REDACTED]

Date: 1/8/2010  
Archana Lab No.: 12524-14  
Technician: [REDACTED]  
Date Sampled: 12/1/2010

Archana Project No.: J-10-044  
Project: FTBL-14 Land Fill  
Sample Identification No.: BP-3 (3-4)

Bulk Specific Gravity: 2.493  
Bulk Specific Gravity (SSD Basis): 2.555  
Apparent Specific Gravity: 2.66

Absorption Percent: 2.52%

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Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: (b) (6)

Date: 1/8/2010

Archana Lab No.: 12524-15

Technician: (b) (6)

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: BP-4 (0-1)

Bulk Specific Gravity: 2.512

Bulk Specific Gravity (SSD Basis): 2.568

Apparent Specific Gravity: 2.662

Absorption Percent: 2.25%

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**SPECIFIC GRAVITY OF FINE AGGREGATE**  
(ASSHTO T84, ASTM C128)

Client: Malcolm Pirnie, Inc.

211 N. Florence Street, Ste. 202

El Paso, Texas 79901

Attn: [REDACTED]

Date: 1/8/2010

Archana Lab No.: 12524-16

Technician: [REDACTED]

Date Sampled: 12/1/2010

Archana Project No.: J-10-044

Project: FTBL-14 Land Fill

Sample Identification No.: BP-4 (3-4)

Bulk Specific Gravity: 2.398

Bulk Specific Gravity (SSD Basis): 2.569

Apparent Specific Gravity: 2.891

Absorption Percent: 7.09%

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**Historical Records Review**  
**Remedial Investigation/Feasibility Study**  
**for Area of Interest North of Castner Range**  
**El Paso, Texas**

**Contract Number: W912DY-10-D-0027 – Delivery Order: DS01**

**June 2017**

**Version: Final**

*Prepared for*

**U.S. Army Corps of Engineers, Tulsa District**  
**CECT-SWT-E**  
**1645 South 101<sup>st</sup> East Ave.**  
**Tulsa, Oklahoma 74128**

*Prepared by*

**KEMRON Environmental Services, Inc.**  
**1359A Ellsworth Industrial Blvd.**  
**Atlanta, GA 30318**  
**404-636-0928**

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## DEFINITIONS

---

**Military Munitions** are all ammunition products and components produced for or used by armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense (DoD), the U.S. Coast Guard, the U.S. Department of Energy, and the National Guard. The term military munitions includes confined gaseous, liquid, and solid propellants; explosives; pyrotechnics; chemical and riot control agents; smokes and incendiaries, including bulk explosives and chemical warfare agents; chemical munitions; rockets; guided and ballistic missiles; bombs; warheads; mortar rounds; artillery ammunition; small arms ammunition; grenades; mines; torpedoes; depth charges; cluster munitions and dispensers; demolition charges; and devices and components of the above. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components other than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954, as amended, have been completed.

**Munitions and Explosives of Concern (MEC)**, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means UXO, DMM, or MC (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

**Unexploded Ordnance (UXO)** includes military munitions that have been primed, fuzed, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and remain unexploded either by malfunction, design, or any other cause.

**Discarded Military Munitions (DMM)** includes military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.

**Munitions Constituents (MC)** include any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

**Material Potentially Presenting an Explosive Hazard (MPPEH)** is material owned or controlled by the DoD that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are munitions within the DoD-established munitions management system and other items that may present explosion hazards (e.g., gasoline cans and compressed gas cylinders) that are not munitions and are not intended for use as munitions.

**Material Documented as Safe (MDAS)** is MPPEH that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

**Material Documented as an Explosive Hazard (MDEH)** (Formerly referred to as material documented as hazardous, or MDAH.) MPPEH that cannot be documented as MDAS, that has been assessed and

documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH. (The MDEH characterization only addresses the explosives safety status of the material.)

**Munitions Debris** is remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

**Small Arms Ammunition** includes ammunition, without projectiles that contain explosives (other than tracers), that is .50-caliber or smaller or for shotguns.

## **ABBREVIATIONS AND ACRONYMS**

---

°F	degree Fahrenheit
amsl	above mean sea level
AOI	Area of Interest
Army	U.S. Army
BRAC	Base Realignment and Closure (Program)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
DMM	discarded military munitions
DoD	U.S. Department of Defense
e <sup>2</sup> M	engineering-environmental Management, Inc.
FS	feasibility study
FUDS	formerly used defense site(s)
Gilbane	Gilbane Federal
HRR	Historical Records Review
KEMRON	KEMRON Environmental Services, Inc.
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligram per kilogram
mm	millimeter
MMRP	Military Munitions Response Program
MRS	munitions response site
NCP	National Contingency Plan
OB/OD	open burn/open detonation
Parsons	Parsons Engineering Science, Inc.
PCL	protective concentration level
PWS	performance work statement
RI	remedial investigation
SARA	Superfund Amendments and Reauthorization Act
TCEQ	Texas Commission on Environmental Quality
URS	URS Group, Inc.
USA	USA Environmental, Inc.
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USAESCH	U.S. Army Engineering and Support Center Huntsville
USC	U.S. Code
UXB	UXB International, Inc.
UXO	unexploded ordnance
WWI	World War I
WWII	World War II

# 1. INTRODUCTION

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The U.S. Congress established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and former military installations. MMRP-eligible sites include areas where UXO, DMM, or MC are known or suspected. Properties classified as operational military ranges, permitted munitions disposal facilities, or operating munitions storage facilities are not eligible for the MMRP.

Based on historical records and previous investigations, the Area of Interest (AOI) North of Castner Range, El Paso, Texas, may contain explosive safety issues posed by munitions and explosives of concern (MEC) and associated releases of MC (e.g., hazardous substances, pollutants, and contaminants) to the environment. The U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at the AOI North of Castner Range site under the MMRP.

## 1.1. Purpose/Scope

The purpose of this Historical Records Review (HRR) is to document historical and other known information for the AOI North of Castner Range, identify potential range fans that could overlap the AOI, and determine the types of munitions used during military activities. This will facilitate decisions to focus on those areas where more information is needed to determine the next steps in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 United States Code (USC) 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Public Law 99-499, (hereinafter CERCLA) process.

KEMRON Environmental Services, Inc. (KEMRON) has been contracted through USACE, Tulsa District to complete environmental response tasks under contract number W912DY-10-D-0027, delivery order DS01. KEMRON has sub-contracted Gilbane Federal (Gilbane) to support this effort. Throughout the remainder of this report, KEMRON and Gilbane will be referred to as the KEMRON Team.

## 1.2. Project Drivers

The regulatory structure for managing the AOI North of Castner Range is guided by a combination of federal, state, and local laws, as well as Department of Defense (DoD) and U.S. Army (Army) regulations and guidance. Key legislative and administrative precedents to date conclude that munitions response actions will be conducted under the process outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations 300) as authorized by CERCLA. The Archives Search Report Supplement (USACE, 2004) marks the completion of the preliminary assessment and the Final MEC Reconnaissance Survey Report (U.S. Army Engineering and Support Center Huntsville [USAESCH], 2015) marks the completion of the site inspection phases of work, respectively, under CERCLA. The key legislative, administrative, and historic precedents include the following.

**DERP Management Guidance (DoD, 2001)** – DERP management guidance establishes an MMRP element for UXO, DMM, and MC defense sites. The history of DERP dates back to SARA. The scope of DERP is defined in 10 USC §2701(b), which states that the: “. . . goals of the program shall include the following: (1) The identification, investigation, research and development, and cleanup of contamination from hazardous substances, and pollutants and contaminants. (2) Correction of other environmental damage (such as detection and disposal of unexploded ordnance) which creates an imminent and substantial endangerment to the public health or welfare or to the environment.”

**Army DERP Management Guidance for Active Installations (Army, 2004)** – The Army DERP management guidance provides direction for active installations and Base Realignment and Closure Program (BRAC) excess properties on managing the Army Installation Restoration Program, the MMRP, and the Building Demolition and Debris Removal Program categories that are related to environmental cleanup. The Army DERP management guidance does not apply to Army restoration activities overseas, the BRAC Environmental Restoration Program, the Compliance-Related Cleanup Program, or the Formerly Used Defense Sites (FUDS) Restoration Program. The guidance document was provided to implement the Army's DERP in accordance with the DoD DERP management guidance. The Army DERP management guidance supplements the roles, responsibilities, and procedures contained in Army Regulation 200-1 (Army, 1997) and the Department of Army Pamphlet 200-1 (Army, 2002).

**National Defense Authorization Act (FY02) (Sections 311-313)** – Sections 311-313 of the National Defense Authorization Act of fiscal year 2002 reinforce the DoD 2001 DERP management guidance by tasking the DoD to develop and maintain an inventory of defense sites that are known or suspected to contain UXO, DMM, or MC. Section 311 requires DoD to develop a protocol for prioritizing defense sites for response activities in consultation with the states and tribes. Section 312 requires DoD to create a separate program element to ensure that DoD can identify and track munitions response funding. Section 313 directs DoD to provide a comprehensive assessment of UXO, DMM, and MC at defense sites in the fiscal year 2002 DERP Annual Report to Congress.

The September 2001 management guidance for DERP and the Defense Authorization Act 2002, described above, established the MMRP. DERP and MMRP provide guidance and methods for conducting a baseline inventory of defense sites containing, or potentially containing, UXO, DMM, or MC.

The KEMRON Team will perform work in accordance with federal, state, and local statutes, regulations, and guidance. The Texas Commission on Environmental Quality (TCEQ) is the lead regulatory agency. The AOI North of Castner Range is not on the National Priorities List.

### **1.3. Project Data Quality Objectives**

The primary goal of this environmental response effort is to collect the appropriate amount of information necessary to:

- Characterize the nature and extent of MEC and MC,
- Evaluate the risks posed by MEC and MC to human health and environment, and
- Develop a Decision Document to mitigate risks, if present, posed by MEC and MC to human health and the environment.

### **1.4. Report Organization**

This report is organized into six sections.

**Section 1 – Introduction**—Presents the introduction, objectives, and organization of this report.

**Section 2 – Background**—Describes the history of Fort Bliss and previous investigations at the AOI North of Castner Range.

**Section 3 – Data Collection and Document Review Process**—Describes the historical records search for the AOI North of Castner Range.

**Section 4 – Summary of Historical Records Review Findings**—Provides a summary of the findings for the AOI North of Castner Range.

**Section 5 – Conceptual Site Model**—Presents the description of the AOI and its environment as well as describes the sources, release mechanisms, and MC associated with anticipated MEC.

**Section 6 – Summary and Conclusions**—Summarizes conclusions drawn based on the findings.

Tables and figures are presented after the text. Historical site maps from previous investigations are included in **Appendix A**, sources contacted are provided in **Appendix B**, supporting documents are in **Appendix C**, and munitions data sheets are provided in **Appendix D**.

## 2. BACKGROUND

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The following subsections provide a summary of the chronological history of the installation and the process by which the AOI North of Castner Range was identified.

### 2.1. Installation Description

According to *Final Site Inspection Report, Fort Bliss, Texas* (engineering-environmental Management, Inc. [e<sup>2</sup>M], 2007) and *Final Site Inspection (SI) Report for Fort Bliss, El Paso, Texas* (TLI Solutions, Inc., 2011), Fort Bliss (federal facility identification number: TX213720101) is located in El Paso County in western Texas and Doña Ana County in southern New Mexico on approximately 1.1 million acres of land (**Figure 2-1**). It is the Army's second largest installation, second only to White Sands Missile Range. The Sacramento Mountains lie along the installation's northernmost boundary; the Franklin Mountains, the Organ Mountains, and San Andreas Mountains are located to the west; the Otero Mesa, McGregor Range, and Hueco Mountains run through the eastern portion of the installation; the Tularosa Valley runs through the western portion; and Carlsbad Highway (U.S. Highway 62) runs along the southern boundary.

The primary mission of Fort Bliss is to be prepared for combat operations with trained and ready soldiers and units, which can be deployed rapidly to crisis areas. This includes not only all active forces assigned to Fort Bliss, but also reserve component forces that will activate and mobilize during an emergency. Fort Bliss trains, sustains, mobilizes, and deploys members of the joint team to conduct global, full spectrum operations in support of the national military strategy while providing for the well-being of the regional military community. Furthermore, Fort Bliss is a DoD flagship installations comprised of state-of-the-art training areas, ranges, and facilities led by adaptive, innovative, and warrior-focused professionals focused on individual and unit readiness, leaders development, deployment, security, and the well-being of its members.

### 2.2. Installation History

During the war with Mexico in 1846, Colonel Alexander W. Doniphan and the 1<sup>st</sup> Missouri Mounted Volunteers became the first Army troops to enter the El Paso area. The War Department directed establishing a post in El Paso on November 7, 1848. "The initial mission of the military post was to protect railways, stage routes, and settlers." The post was renamed "Fort Bliss" in honor of Lieutenant Colonel William Wallace Smith Bliss on March 8, 1854. In March 1890, the citizens of El Paso raised money to purchase a permanent site for the post. Troops began to occupy the current site in 1893 (e<sup>2</sup>M, 2007). After the Mexican Revolution started in 1910, the Army gradually increased its troop strength at Fort Bliss. Fort Bliss also changed from an infantry station to the largest cavalry post in the United States (<https://www.tshaonline.org/handbook/online/articles/qbf03>).

Following the turn of the century, Fort Bliss entered its greatest growth period when the Army responded to a raid across the border by Pancho Villa. With the arrival of the 82<sup>nd</sup> Field Artillery Battalion in 1916, Fort Bliss hosted its first artillery unit. The 1<sup>st</sup> Cavalry Division was activated in 1921 (<https://www.tshaonline.org/handbook/online/articles/qbf03>).

Border patrol and defense became a major concern. Until World War II (WWII), the cavalry ruled the post. The Army anti-aircraft artillery arrived in 1940 and re-established the mission of Fort Bliss as the largest overland air defense missile range and training center throughout the free world (e<sup>2</sup>M, 2007). By June 1943, Fort Bliss had phased out horses, and the cavalry had become mechanized. With the 1<sup>st</sup> Cavalry Division's departure in 1943, the fort became primarily an artillery post (<https://www.tshaonline.org/handbook/online/articles/qbf03>). William Beaumont Army Medical Center

was added after WWII. The U.S. Air Force closed Biggs Air Force Base (now called Biggs Army Air Field) in 1966 and turned it over to Fort Bliss (e<sup>2</sup>M, 2007).

### **2.3. AOI North of Castner Range**

According to the performance work statement (PWS) for this remedial investigation (RI)/feasibility study (FS), the AOI North of Castner Range (Army Environmental Database-Restoration # FTBLS-007-R-01) includes 5,860 acres of the total 7,936-acre AOI due to safety concerns related to steep and mountainous terrain in the western 2,256 acres (**Figure 2-2**). It is located in El Paso County, Texas north of the Closed Castner Range and is bounded by Martin Luther King Boulevard on the east, the Franklin Mountains State Park on the west, and Stan Roberts Sr. Avenue on the north (**Figure 2-1**). Housing developments exist to the southeast and a quarry operates just north of the northern boundary.

The PWS states that this area was never owned or leased by Fort Bliss and there is no record of it having been used by Fort Bliss. Based on a conversation with Fort Bliss personnel, the AOI was identified when munitions debris (MD) items were found during background sampling activities conducted in support of a field effort on the adjacent Closed Castner Range.

As indicated in the PWS, an open burn/open detonation (OB/OD) area (**Figure 2-2**) is located just south of the AOI in the Closed Castner Range. It is assumed by the U.S. Army Environmental Command (USAEC) that the MD came from the adjacent Closed Castner Range either as kick-out debris from the OB/OD area or possibly from overshoot during training exercises.

### **3. DATA COLLECTION AND DOCUMENT REVIEW PROCESS**

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Eight sources provided the information that was researched and gathered as part of the data collection effort for this HRR.

- 1) USACE
- 2) USAEC
- 3) Installation site visits
- 4) Interviews
- 5) Local government offices
- 6) Historical societies, museums, and libraries
- 7) Aerial photographs
- 8) Internet research

#### **3.1. Data Collection Methods**

The following sections describe the data collection methods for the eight sources identified above. The actual sources contacted and a list of relevant documents and information collected for this report are presented in **Appendix B**. Supporting documents are provided in **Appendix C**.

It is noted that the source documents vary in degrees of quality. For example, historical military documents are considered to be of the highest quality and are considered primary sources of information; whereas, newspaper articles and interviews can be of value, but often need to be corroborated by an alternate source. Other primary sources of information include aerial photographs and original source material. Environmental reports that summarize historical data are considered secondary sources of information and are not as reliable as a primary source document. Although attempts were made to use the highest quality source documents throughout the development of this report, limited primary source data were available to support this HRR.

##### **3.1.1. U.S. Army Corps of Engineers**

Contract and project management is provided by the USACE Project Managers at USACE, Tulsa District. Records and documentation related to Fort Bliss operations in the vicinity of the AOI were provided to the KEMRON Team by USACE and USAEC as part of the RI background data.

##### **3.1.2. U.S. Army Environmental Command**

Contract management is also provided by USAEC. Records and documentation related to Fort Bliss operations in the vicinity of the AOI were provided to the KEMRON Team by USACE and USAEC as part of the RI background data.

##### **3.1.3. Installation Site Visits**

A field team visited Fort Bliss during the week of January 16, 2017. The team conducted research at several offices including the Directorate of Public Works Environmental Division, the Fort Bliss Museum, the Master Planning and Real Property Divisions, and the installation historian. Summaries of information obtained from each office are located in **Appendix B**.

### 3.1.4. Interviews

Information regarding the AOI North of Castner Range was requested from the following people.

- Mike Santa Maria with Mountain Vista Builders
- Doug Schwartz with the Southwest Land Development
- Janae Reneaud Field with the Frontera Land Alliance
- Judy Ackerman with the Franklin Mountains Wilderness Coalition.

Summaries of the information obtained from these individuals are located in **Appendix B**.

### 3.1.5. Local Government Offices

A field team visited Fort Bliss the week of January 16, 2017. The team requested information from the El Paso County Sheriff and the El Paso Police Department. Summaries of information obtained from each office are located in **Appendix B**.

### 3.1.6. Historical Societies, Museums, and Libraries

A field team visited Fort Bliss the week of January 16, 2017. The team conducted research at several repositories at this time including the El Paso County Historical Society, El Paso Public Library, Mickelsen Library, and University of Texas at El Paso Library. Summaries of information obtained from each repository are located in **Appendix B**.

### 3.1.7. Aerial Photographs

Aerial photographs were reviewed from Google Earth Pro; however, imagery was only available after and including 1996. This is beyond the timeline of potential use, kick-out, or overshoot by the Army.

### 3.1.8. Internet Research

In addition to the data sources listed above, internet research was also conducted to supplement archival data and information received from the installation. Websites included, but were not limited to the following.

- [www.bliss.army.mil](http://www.bliss.army.mil)
- [www.lib.utexas.edu](http://www.lib.utexas.edu)
- [www.tpwd.state.tx.us](http://www.tpwd.state.tx.us)
- [www.tshaonline.org](http://www.tshaonline.org)
- [www.globalsecurity.org](http://www.globalsecurity.org)
- [www.census.gov/quickfacts](http://www.census.gov/quickfacts)
- [cartridgecollectors.org/](http://cartridgecollectors.org/)
- [www.wikipedia.org](http://www.wikipedia.org).

## 4. SUMMARY OF HISTORICAL RECORDS REVIEW FINDINGS

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The following subsection provides a summary of the findings for the AOI North of Castner Range. The information acquired for the AOI is supported by various historical figures and photographs.

### 4.1. Area of Interest Description

The following subsections describe the operations conducted at the AOI North of Castner Range that were associated with munitions use and previous investigations conducted near the AOI.

#### 4.1.1. AOI North of Castner Range

The AOI North of Castner Range is described in the PWS as 7,936 acres located in El Paso County, Texas. The RI area includes 5,860 acres of the total 7,936-acre AOI due to safety concerns related to steep and mountainous terrain in the western 2,256 acres. It is located north of the Closed Castner Range and is bounded by Martin Luther King Boulevard on the east, Franklin Mountains State Park on the west, and Stan Roberts Sr. Avenue on the north (**Figure 2-1**). Housing developments exist to the southeast and a quarry is in operation just north of the northern boundary.

The PWS states that this area was never owned or leased by Fort Bliss and there is no record of it having been used by Fort Bliss. Based on a conversation with Fort Bliss personnel, the AOI was identified when MD items were found during background sampling activities conducted in support of a field effort on the adjacent Closed Castner Range.

According to *Field Demonstration Report of Incremental Sampling Methodology at the Closed Castner Firing Range Fort Bliss, Texas* (URS Group Inc., [URS] 2013), after collecting and analyzing the first phase of background samples in February 2011, the Army determined that one background sample location (located in the southeastern corner of the AOI) was in an area that qualified for the FUDS program (URS, 2013). It is assumed that these are the background sampling activities that aided in the identification of the AOI North of Castner Range.

In the subsequent MEC Reconnaissance Survey (USAESCH, 2015), discussed in further detail in **Section 4.2** below, MD was identified mostly in the southern portion of the AOI North of Castner Range (**Figure 4-1**) and included small arms casings, fragments of munitions of unknown type and model, and expended 75 millimeter (mm) shrapnel projectiles (**Table 4-1**) (USAESCH, 2015).

It is assumed by USAEC that the MD identified within the AOI North of Castner Range came from the adjacent Closed Castner Range either as kick-out debris from the OB/OD area or possibly from overshoot during training exercises. However, research did not identify any range fans that overlapped the AOI (**Figure A-1**). Additional features depicted on the “Historical Range Locations and Areas of Concern on Castner Range Munitions Response Site (MRS)” historical figure include “structure disturbed area” and “trenches” from the 1930s, a mortar range from the 1940s, a “structure” and “demolition area” from the 1950s, a simulated Vietnam village area from the 1960s, and numerous unidentified “areas of concern (**Figure A-1**).” The mortar range was identified in a previous investigation and is discussed in **Section 4.2**. No additional information was discovered for the remaining ranges adjacent to the AOI North of Castner Range.

Dr. John Hamilton, historian and curator of the Fort Bliss Museum, provided insight into the potential use of the AOI North of Castner Range. He stated that it was possible the AOI was used by the cavalry regiments in the early 1900s (1910–1930) for training (**Photograph 4-1**), using the Franklin Mountains as a backstop for mountain field guns (**Photograph 4-2**). The location of this training would have likely

gone undocumented given the timeframe. The 82<sup>nd</sup> Field Artillery Regiment, 82<sup>nd</sup> Field Artillery Battalion, and 1<sup>st</sup> Cavalry Division would have been present on Fort Bliss at that time and would have trained with munitions like those identified at the AOI in previous investigations (75mm shrapnel projectiles).

The 82<sup>nd</sup> Artillery Regiment was first constituted on July 1, 1916 in the regular Army as Troops A and B, 24<sup>th</sup> Cavalry and organized on June 5, 1917 at Fort D.A. Russell, Wyoming (<http://www.globalsecurity.org/military/agency/army/1-82fa.htm>). The regiment arrived at Fort Bliss on December 10, 1917 and remained there training “without a break” until June 1919 when the unit first saw action in operations across the Rio Grande River in the Battle of Juarez (Cobb, date unknown). On September 9, 1921 the 82<sup>nd</sup> Field Artillery was composed of "A," "B," and "C" batteries and was designated the 82<sup>nd</sup> Field Artillery (Horse) Battalion. The battalion was the only horse artillery in the Army at the time and the designation meant that all unit members rode mounted horses instead of riding on gun carriages ([http://www.first-team.us/assigned/subunits/82nd\\_fa/](http://www.first-team.us/assigned/subunits/82nd_fa/)).



**Photograph 4-1. Horse-Drawn Artillery at Fort Bliss (date unknown)**

Based on *82<sup>nd</sup> U.S. Field Artillery 1919* (Various unknown authors, 1919), it is known that the 82<sup>nd</sup> Field Artillery Regiment was provided with 3-inch field guns in March 1918. One account states that Battery “D” received their 3-inch guns and conducted training “on the range.” Another account states that Battery “E” received their equipment in the spring of 1918 and began a series of field maneuvers and intensive training in the use of artillery. This training was described as follows: “...we again went on the range this time to fire a barrage a method of firing that was being used on the battlefields of Europe at that time...Batteries went into position behind some low hills about 3000 yards behind the enemys [sic] front line trenches and about 1500 yards in rear of our own, our problem was to fire a creeping barrage keeping just ahead of our advancing infantry until we came to the enemys [sic] barbed wire here we were to concentrate our fire until this was demolished and then lifting our fire we were to bombard the enemys [sic] trenches in the rear to prevent them bringing up reinforcements” (Various unknown authors, 1919).

*Desert Army, Fort Bliss on the Texas Border* (Metz, 1995) provides a description of a training event at an unidentified date from a pilot named Stacy C. Hinkle. “He explained how the 82<sup>nd</sup> Field Artillery at Fort Bliss would haul its 75mm guns to the desert firing ranges. Since the targets were hidden from the artillerymen, the planes acted as spotters, always being careful to avoid shell trajectory and being themselves shot down” (Metz, 1995).

The 82<sup>nd</sup> Field Artillery Battalion became the sole artillery regiment assigned to the newly organized 1<sup>st</sup> Cavalry Division. It became known as the "Flying Horse Artillery" during service with the 1<sup>st</sup> Cavalry Division in the American Southwest along the border with Mexico. The unit was reorganized and redesignated on March 17, 1930 as Battery A, 82nd Field Artillery and again on January 3, 1941 as Battery A, 82nd Field Artillery Battalion. The unit deployed to the Pacific Theater in WWII with the 1<sup>st</sup> Cavalry Division (<http://www.globalsecurity.org/military/agency/army/1-82fa.htm>).

The history of the 1<sup>st</sup> Cavalry Division began in 1921 after the Army established a permanent cavalry division April 4, 1921. The 1<sup>st</sup> Cavalry Division was formally activated on September 13, 1921 at Fort Bliss, Texas. The early duties in west Texas included rough-riding and patrolling the Mexican border. In 1923, the 1<sup>st</sup> Cavalry Division held division maneuvers for the first time, intending, but unable due to financial constraints, to hold them annually thereafter. In 1927, through the generosity of a few ranchers who provided free land, the division was able to conduct such exercises again. Technological progress of the 1940s diminished the usefulness of horse-mounted soldiers and the division turned in its horses and prepared to serve as dismounted cavalry in WWII's Pacific Theater (<https://www.1cda.org/history.html>).

As stated above, the 82<sup>nd</sup> Field Artillery Regiment, 82<sup>nd</sup> Field Artillery Battalion, and 1<sup>st</sup> Cavalry Division would have been present on Fort Bliss in the early 1900s and would have trained with munitions like those identified at the AOI in previous investigations. These training activities likely included use of the weapons described below, although no records exist of training activities conducted within the AOI.

The Army adopted the French 75mm field gun during World War I (WWI) and used it extensively in battle. The French 75mm field gun was a quick-firing field artillery piece adopted in March 1898. Its official French designation was: Matériel de 75mm Mle 1897. The French 75 was designed as an anti-personnel weapon system for delivering large volumes of time-fused shrapnel shells on enemy troops advancing in the open. Shrapnel shells were anti-personnel artillery munitions that carried a large number of individual bullets close to the target and then ejected them to allow them to continue along the shell's trajectory and strike the target individually. They relied almost entirely on the shell's velocity for their lethality. The munition has been obsolete since the end of WWI for anti-personnel use, when it was superseded by high-explosive shells for that role ([www.wikipedia.org](http://www.wikipedia.org)).

The French 75 is widely regarded as the first modern artillery piece. In typical use, the French 75 could deliver 15 rounds per minute, either shrapnel or high-explosive, on its target, up to about 8,500 meters (5.3 miles) away. Its firing rate could reach near 30 rounds per minute, albeit only for a very short time and with a highly experienced crew. It fired a 7.24-kilogram (16.0-pound), time-fused shrapnel shell containing 290 lead balls. The balls shot forward when the fuze's timer reached zero, ideally bursting high above the ground and enemy troops. During 1914 and 1915, the shrapnel shell was the dominant type of ammunition found in the French 75 batteries. However, by 1918, high-explosive shells had become virtually the sole type of 75mm ammunition remaining in service. Furthermore, several new shells and fuzes were introduced due to the demands of trench warfare. The U.S. designation of the basic weapon was 75mm gun M1897 ([www.wikipedia.org](http://www.wikipedia.org)).

The 3-inch field gun M1902 (76mm), also known as M1904 and M1905, was the Army's first nickel-steel, quick-firing field gun with a recoil mechanism. The gun fired 3-inch (76mm) steel, shrapnel, or explosive shells that weighed 15 pounds (6.8 kilograms). The use of nickel-steel construction meant that the M1902 could fire a heavier shell at a higher muzzle velocity and greater accuracy (due to tighter rifling) than any other field gun of American origin to that point. It had an effective range of 6,500 yards (5,900 meters) and a maximum range of 8,500 yards (7,800 meters). The maximum rate of fire was 15 rounds per minute. This weapon replaced the 3.2-inch gun M1897 in most combat units, but both weapons remained in service until after WWI. The M1902/5 was in service from 1905 through 1919. During WWI, the Army primarily used the French 75mm gun instead of the M1902s, which were mostly

kept in the United States for training. They were gradually phased out of active service in the 1920s (www.wikipedia.org).



**Photograph 4-2. Field Artillery Fires Live Ammunition on Ranges near El Paso (date unknown)**

The 75mm Pack Howitzer M1 (redesignated the M116 in 1962) was an artillery piece used by the United States after WWI. It was designed in the 1920s to meet a need for a howitzer that could be moved across difficult terrain. The gun and carriage were designed to be broken down into several pieces to be carried by pack animals. In addition to the pack configuration, the gun was mounted on a conventional carriage to serve as a field artillery piece (www.wikipedia.org).

#### **Closed Castner Range OB/OD Area**

The OB/OD area located just south of the AOI in the Closed Castner Range (**Figure A-2**) was identified in *Final Site Inspection Report, Fort Bliss, Texas* (e<sup>2</sup>M, 2007) as Castner OB/OD Pit B-1 (FTBL-072). OB/OD Pit B-1 was a former OB/OD pit located near the northernmost boundary of the Closed Castner Range. The exact dates of use are not known, but would match the use of Castner Range from 1926 to 1966. This pit was used as a “burn kettle” or “burn pit” exclusively for the destruction of small arms ammunition. The center of the site, which sits on the side of an arroyo that runs east out of the Franklin Mountains, was a small concrete pit, 5 feet by 10 feet with 2-foot high walls open on one side. During an RI/FS conducted at the OB/OD Pit B-1, the lead contamination from “blow out” at the pit was distributed in the near soil in a cloverleaf pattern. This pattern is typical of the open burning of small arms ammunition, which would rupture the casing and expel the lead cartridge away from the pit (e<sup>2</sup>M, 2007). Several removal actions have been conducted at the OB/OD Pit B-1 and are discussed in **Section 4.2**.

#### **North FUDS Area**

According to the supporting historical documentation provided with *Final MEC Reconnaissance Survey Report, Former North Castner Range, El Paso, TX* (USAESCH, 2015), discussed in further detail in **Section 4.2**, an area identified as the North FUDS Area is located in the southeastern corner of the AOI North of Castner Range (**Figure A-3**). The North FUDS Area is 640 acres and contains no former ranges or ordnance use areas. Although this site was not directly used for any Castner Range operations, numerous ordnance items and debris fragments have been identified within its boundary. This site is included in the safety fan of a demolition area in the far north portion of the main Castner Range. It is

conjectured that these items may have been dispersed during demolition explosions from disposal activities in the extreme north part of Castner Range (USAESCH, 2015).

## 4.2. Previous Investigations

The only known previous investigation conducted at the AOI North of Castner Range was a MEC reconnaissance survey completed by USAESCH from 2013 to 2015. The survey was conducted to gather sufficient data to determine the MEC-related characteristics of the site and resulted in the categorization of the site into areas recommended for RI and areas not recommended for RI (USAESCH, 2015).

The survey was an instrument-assisted qualitative and quantitative reconnaissance that documented items encountered on the surface as well as quantities of detected subsurface anomalies. The AOI North of Castner Range exhibited evidence of past military training activity primarily in the southern portion. The majority of the northern area exhibited no evidence of explosives hazards. The teams that conducted the survey traversed 66.36 miles of transects for a total of 4,909 acres being assessed. Munitions-related observations ranged from no evidence of explosive hazards to several expended 75mm shrapnel projectiles as well as fragments from light, medium, and heavy high-explosive munitions. No MEC items and no range-related debris were observed; however, 88 MD items and 1,020 cultural debris items were identified (USAESCH, 2015). **Table 4-1** provides a list of the MD items encountered during the MEC reconnaissance survey and **Figure 4-1** depicts their locations.

Previous investigations at the OB/OD Pit B-1 in the adjacent Castner Range are discussed below to provide information relevant to kick-out debris and associated chemical contamination potentially present in the southern portion of the AOI North of Castner Range.

### OB/OD Area

#### 1994 UXO Site Characterization

The *Final Site Inspection Report, Fort Bliss, Texas* discussed a UXO Site Characterization After Action Report Letter by Environmental Hazards Specialists International, Inc. submitted in 1994. The purpose of the UXO site characterization was to assess and document the extent, location, and hazards of UXO contamination within the Castner Range. Approximately 6,700 acres were investigated with 720 acres investigated via grids and search lanes, or were traversed on foot and visually swept. The remaining acreage was randomly covered on foot or using all-terrain vehicles. Site B-1, which corresponds to OB/OD Pit B-1, was described as a demolition area for the disposal of munitions (**Figure A-4**). While most items were left in place, some were removed or detonated (e<sup>2</sup>M, 2007).

One UXO item – a 40mm projectile – and numerous MD items were identified in Area B-1. The MD items included the following (e<sup>2</sup>M, 2007).

- 5 – 37 AP projectiles
- 4 – 90mm projectiles, inert
- 7 – rifle grenades, tail sections
- 1 – 3.5-inch rocket motor, empty
- 4 – 3.5-inch rocket nose caps, empty
- 3 – mechanical time fuzes, expended
- 3 – base fuzes, expended
- 57 – .30-caliber small arms casings, empty
- 83 – .50-caliber small arms casings, empty
- 2 – hand grenade, spoons
- 200+ – assorted .30- and .50-caliber bullets

- 1 – pressure release booby trap device, expended
- 100+ – fragments from large projectiles
- 100+ – fragments from small caliber projectiles

#### 1997 Castner Range Removal Action Report

The *Final Report for Castner Range, Fort Bliss, Texas, Unexploded Ordnance (UXO) Removal Action* (UXB International, Inc., [UXB], 1997) describes a 1995 surface removal action conducted on areas that were determined to pose an immediate risk to the public. Area B, which corresponds with OB/OD Pit B-1, is located in the northernmost portion of the Closed Castner Range (**Figure A-5**) and was described as a former OB/OD area. Area B included 40 acres over which 100% surface clearance action was performed. UXO contamination included 20mm to 40mm projectiles, blasting caps, small arms, and grenade and projectile fuzes. The locations of discovered items were not identified (UXB, 1997).

A total of 66 UXO items were identified as listed below (UXB, 1997).

- 1 – blasting cap with adaptor
- 2 – .50-caliber small arms (small arms are not considered UXO.)
- 5 – fuzes, unidentified make and model
- 2 – 20mm high-explosive projectile
- 1 – 30mm high-explosive projectile
- 1 – 40mm high-explosive projectile without fuze
- 3 – 40mm high-explosive projectile
- 14 – base fuzes, unidentified make and model
- 2 – M48 fuze
- 1 – point detonating fuze, unidentified make and model
- 1 – rifle grenade fuze, unidentified make and model
- 1 – M502 mechanical time fuze
- 1 – variable time fuze, unidentified make and model
- 1 – mechanical time fuze, unidentified make and model
- 30 – grenade fuzes, unidentified make and model

#### 1998 OE Characterization and Cost Analysis Report

An *OE Characterization and Cost Analysis Report for Fort Bliss: Castner Range* (Parsons Engineering Science, Inc. [Parsons], 1998) describes pre-WWII era live fire exercises in the Franklin Mountains at McKelligon Canyon. A Google Maps search indicates the location of McKelligon Canyon as southwest of the Closed Castner Range. This indicates that there may have been use agreements for training operations in areas adjacent to Castner Range that were independent of range operations and may not have been confined to government-owned property (Parsons, 1998).

WWII era ranges included Range 15, which was identified as a mortar range. This mortar range is located in the northeastern corner of the Closed Castner Range (**Figure A-1**). No additional information, including munitions used and direction of fire, was provided (Parsons, 1998).

Additionally, according to the *Final Site Inspection Report, Fort Bliss, Texas*, two investigations were conducted in Castner Range in 1998, but neither in proximity to AOI (e<sup>2</sup>M, 2007).

#### 2001 Addendum #1 Remedial Action Plan OB/OD Pit

According to the *Final Site Inspection Report, Fort Bliss, Texas* (e<sup>2</sup>M, 2007), in December 1996, surface soil sampling was conducted at the OB/OD Pit B-1 by the USACE, Fort Worth District to collect chemical data for a DoD Relative Risk Site Evaluation compliant with the Addendum #1 Remedial Action Plan OB/OD Pit B-1 Site (FTBL-072) in the Closed Castner Range. Four surface soil samples

were taken from outside of the pit (**Figure A-6**). Lead was detected at concentrations up to 17,426 milligrams per kilogram (mg/kg). Barium, cadmium, and chromium were detected above Fort Bliss background levels. The explosives 2,4-dinitrotoluene and 2,6-dinitrotoluene were detected above protective concentration levels (PCLs; e<sup>2</sup>M, 2007).

In November 1999, Malcolm Pirnie, Inc., completed sampling at the OB/OD Pit B-1 (**Figure A-6**). Lead was detected in samples at concentrations up to 12,100 mg/kg, and explosives (2,4-dinitrotoluene) were detected in samples at concentrations up to 15.1 mg/kg (e<sup>2</sup>M, 2007).

#### 2004 Fort Bliss Installation Action Plan

*Final Site Inspection Report, Fort Bliss, Texas* (e<sup>2</sup>M, 2007) states that an RI/FS for the OB/OD Pit B-1 was conducted in the spring of 2000. Soil samples were taken at surface, near surface, and down to 2 feet below the ground level. Lead concentrations were discovered in the near surface soil. One detection of lead in the near surface soils downhill from the site was 12,100 mg/kg. Soil below and above that location were much less. Sample names, locations, and results were not available (e<sup>2</sup>M, 2007).

Additionally, it was stated that Fort Bliss completed a removal action at this site. The Response Action Completion Report was submitted in November 2001 and a closure letter was received from TCEQ on 10 January 10, 2003 (e<sup>2</sup>M, 2007).

#### 2004 Removal Action Report

During a removal action of Area 1 in the northeastern corner of the Closed Castner Range immediately adjacent to the AOI North of Castner Range (**Figure A-7**), 167 acres of surface and subsurface (up to 3 feet) were completed from July 2003 to March 2004 as described in the *Final Removal Report, Ordnance and Explosives (OE) Removal Action at Castner Range, Fort Bliss, Texas* (USA Environmental, Inc. [USA], 2004). Area 1 contained a large number of subsurface anomalies including buried fighting positions and machine gun firing positions. These areas had sizeable amounts of metallic debris including small arms cartridges, machine gun ammunition links, and other training debris. USA located, identified, and disposed of 32 UXO items and 15 MD items within Area 1 (USA, 2004). The nature of the UXO was not determined.

#### 2013 Field Demonstration of Incremental Sampling Methodology

*Field Demonstration Report of Incremental Sampling Methodology at the Closed Castner Firing Range, Fort Bliss, Texas* (URS, 2013), states that the OB/OD Pit B-1 (FTBL-072) was cleared to a depth of 1 foot in June 2001 and no ordnance was found on the site. During site investigation of the OB/OD area in 2002, soil samples were tested for suspected MC including explosives and Resource Conservation and Recovery Act metals. Results indicated that no regulated materials were detected on the site above U.S. Environmental Protection Agency Region 6 screening levels. However, during sampling conducted during the first phase of the field demonstration in 2011, two samples collected near the OB/OD Pit B-1 exhibited elevated concentrations. Sample CR-MIS-AD044-01 contained the explosive commonly known as 1,3,5-trinitroperhydro-1,3,5-triazine (or RDX) above PCLs and sample CR-MIS-AA035-01 contained cadmium; lead; silver; mercury; 2,4-dinitrotoluene; and 2,6-dinitrotoluene above PCLs. The location of CR-MIS-AA035-01 is depicted on **Figure A-8**; however, the location of CR-MIS-AD044-01 could not be identified (URS, 2013).

Background samples were also collected during the field demonstration. As stated previously, one background sample was collected in the southeastern corner of the AOI North of Castner Range as part of the first phase of this effort. It exceeded the PCL of 15 mg/kg for lead. An additional 14 background samples were collected in the AOI during the second phase of this effort. Results indicate that two of these background samples exceeded the PCL for lead (URS, 2013). The location of these 15 background samples is depicted on **Figure A-9**.

Note that a summary of UXO cleared areas and UXO removed from 1995 through 2004 on the Closed Castner Range is provided on **Figure A-10** and **Figure A-11**, respectively.

## 5. CONCEPTUAL SITE MODEL

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The conceptual site model (CSM) is a description of a site and its environment that is based on existing knowledge. The CSM describes sources of environmental contaminants or MEC hazards at a site, actual or potential pathways, current or proposed use of the property, and potential receptors of contaminants or hazards (**Figure 5-1**). It provides a planning tool to integrate site information from a variety of sources, evaluate the information with respect to project objectives and data needs, and respond through an iterative process for further data collection or action. The CSM development is a process that reflects the progress of activities at a site from initial assessment through site closeout. Depending on the complexity of the investigation, typical information in the CSM includes the following.

- Facility profile that describes all man-made features at or near the site
- Physical profile to describe factors that may affect release, fate, and transport
- Land use and exposure profile to provide information used to identify and evaluate the applicable exposure scenarios and receptor locations
- Ecological profile to describe the physical relationship between developed and undeveloped portions of the site, use of the undeveloped portions, and ecological use
- Release profile relating the extent of contaminants or hazards in the environment.

### **Facility Profile**

#### Area and Layout:

- The AOI is located in El Paso County, Texas.
- Fort Bliss and El Paso, Texas, are south and east of the AOI.
- The AOI is comprised of 7,936 acres that were never officially owned or used by the Army.

#### Boundaries:

- The AOI is bordered to the south by the closed Castner Range and bounded by Martin Luther King Boulevard on the east, the Franklin Mountains State Park on the west, and Stan Roberts Sr Avenue on the north.

#### Structures:

- A housing development exists adjacent to the AOI to the southeast and an operating quarry is immediately north of the northern boundary.
- Structures currently on site, including the “Round House,” are related to ranching activities.

#### Utilities:

The only known electric, water, or sewer utilities present within the AOI boundaries is a gas main line. This and potential unknown underground utilities will be identified in the DGM data and avoided during intrusive operations.

#### Security:

- No site security measures exist.

### ***Physical Profile***

#### Climate:

- Days are typically warm, nights are cool, and the area is frost-free for an average of 220 days per year.
- The average temperature typically varies from 32 degrees Fahrenheit (°F) to 97 °F and is rarely below 22 °F or above 104 °F. Extreme temperatures have been recorded from -8 °F to 114 °F.
  - The daily average temperature is 64 °F, with maximum and minimum daily averages of 76 °F and 51 °F, respectively.

- Low humidity is typical in winter and high humidity is common in summer.
- Average annual precipitation is 8 inches in the valleys and 20 inches in the mountains, with most precipitation occurring during summer months.
- Winds are typically light, with an average annual velocity of 10 miles per hour.

**Topography:**

- El Paso County includes an irrigated valley along the Rio Grande; semiarid bench land east of the river (locally referred to as “the mesa”); and two small mountain ranges, the Franklin Mountains in the northwestern part of the county and Hueco Mountains in the eastern part.
- The average elevation of El Paso is 3,800 feet above mean sea level (amsl).
- North Franklin Mountain is the highest peak in the city with an elevation of 7,192 feet amsl.
- The average elevation at the AOI is 4,180 feet amsl.
- The eastern portion of the AOI consists of flat to rolling terrain that becomes steep and mountainous towards the west.

**Geology:**

- The AOI is located in the Basin and Range Province physiographic region, which is characterized by vast desert basins flanked by isolated, nearly parallel mountain ranges of bedrock that generally trend north or northwestward.
- The valley floor, known as the Hueco Bolson, is comprised of colluvial and alluvial sediment of Quaternary age.
- Caliche, lake deposits rich in salt and gypsum, and sand and gravel are the dominant sediment types in the basin area.
- The formations in the area range from Precambrian to Holocene in age.
  - Exposed Precambrian rocks in the western portion of the AOI include nearly 5,000 feet of metamorphosed sedimentary and volcanic rocks that have been intruded by granite.

**Soil:**

- The region includes the: Agustin, Delnorte, Pintura, and Wink soil associations/complexes, all of which may be found in the AOI.
  - The Agustin is characterized by deep, pale-brown gravelly soils at the base of limestone and igneous mountains and on alluvial fans, generally near gravelly arroyos.
  - The Delnorte is characterized by shallow to very shallow hard caliche. Very gravelly soils formed over outwash material of sand and gravel. They occur on foot slopes and outwash plains of igneous and limestone mountains.
  - The Pintura is characterized by deep, somewhat excessively drained soils formed in coarse textured aeolian material. They are on coppice dunes on uplands with 0% to 5% slopes.
  - The Wink is characterized by deep, well-drained soils formed in calcareous eolin sediment. They are on upland pediments.
- Soils in valleys and basins are shallow to deep, nearly level to very steep, and well-drained to excessively drained soils.
- Soil erosion varies from low to severe across the AOI.

**Hydrogeology:**

- The AOI is underlain by the Hueco bolson aquifer, which is the principal aquifer in the El Paso area.
  - It consists of an upper fluvial zone of mostly stream-channel and flood-plain deposits composed of silt, sand, gravel, and caliche; and a lower lacustrine zone containing mostly clay and silt.

- The maximum aquifer thickness is approximately 9,000 feet and occurs within a deep structural trough paralleling the east side of the Franklin Mountains.
- Recharge is principally from precipitation percolating through alluvial deposits along the base of the Organ and Franklin mountains.
- Groundwater in the valley is under leaky artesian conditions.
- Water levels in the aquifer have been affected by extensive historical withdrawals which have caused major water-level declines.
- Depth to water ranges from approximately 350 feet near pumping centers to less than 100 feet elsewhere.

**Hydrology:**

- No major source of surface water is present within the AOI.
- Intermittent streams drain from the Franklin Mountains in the western portion of the site into lower lying areas to the east.
- Additional intermittent streams drain rock outcrops and high elevation areas in various directions around the site.
- Intermittent streams do not appear to drain to any main stream or river, but rather seep through the permeable soils into groundwater or are lost to evaporation.

**Vegetation:**

- Habitat in this area is predominately Chihuahuan Desert, dominated by honey mesquite coppice dunes and sand scrub in low lying areas, and includes plants such as soap tree yucca, four-wing saltbush, broom snakeweed, grasses, and various annuals (**Photograph 5-1**).



**Photograph 5-1. Vegetation within AOI North of Castner Range**

- Some small areas in these dunes are dominated by grasses and yucca, while other areas contain creosote bush and cactus.
- Plant communities that exist in the mountains include juniper savanna, conifer and mixed woodlands, and montane conifer forests.

**Wetlands:**

- Wetlands may be present in the form of arroyo-riparian drainages, although these habitats are not common.

### ***Land Use and Exposure Profile***

#### Beneficial Resources:

- Franklin Mountains State Park (camping, hiking, mountain biking, ecological, cultural and historic resources)
- Potable groundwater supplies
- Biological resources including rare wildlife and ecosystems

#### Current Land Use:

- Residential housing
- Light industry and commercial
- Cattle grazing
- Recreation, education, and wildlife preserve
- Majority of the site is undeveloped

#### Current Human Receptors:

- Recreational (adult/child)
- Residents (adult/child)
- Industrial and commercial users
- Franklin Mountains State Park personnel
- Construction workers
- Road and trail maintenance personnel
- Ranchers (adult/child)

#### Potential Future Land Use:

- There is no anticipated change in land use

#### Potential Future Human Receptors:

- There is no anticipated change in human receptors

#### Zoning/Land Use Restrictions:

- According to the El Paso City website, the following zoning areas exist in the AOI:
  - G-MU – General Mixed Use District
  - PMD – Planned Mountain Development District
  - R-F – Ranch and Farm District

#### Demographics:

- According to a 2015 census estimate, El Paso County has a population of 835,593 and the city of El Paso, Texas has a population of 681,124 (<http://www.census.gov/quickfacts>).

### ***Ecological Profile***

#### Habitat Type:

- Mesquite coppice dunes
- Mountain habitats
- Intermittent streams
- Playas and natural water-collecting rock formations

**Degree of Disturbance:**

- Extensive disturbance has occurred in select areas due to construction of roadways, commercial and residential structures, and gravel operations

**Ecological Receptors:**

- No federal listed species of concern, threatened, and/or endangered species are known to be present or potentially present in the AOI.
- State listed species of concern, threatened, and/or endangered species known to be present or potentially present in the AOI include:
  - Six birds: Northern Aplomado Falcon, Peregrine Falcon, American Peregrine Falcon, Interior Least Tern, Mexican Spotted Owl, Southwestern Willow Flycatcher
  - Two mammals: Gray wolf, Black bear
  - One plant: Sneed's pincushion cactus
  - Three reptiles: Texas horned and Mountain short-horned lizards, Chihuahuan Desert lyre snake
- (<http://www.tpwd.state.tx.us>)

**Cultural, Archaeological, and Historical Resources:**

- No information has been located for potential cultural, archeological, or historical resources within the AOI. Based on input from the installation, however, there is a potential for cultural resources to be located throughout the site.

***Release Profile*****Munitions Types:**

- Small arms live rounds.
- Small arms blanks.
- Artillery: 75mm projectiles.

**Release Mechanisms:**

- Intentional munitions firing.
- Simulation of war time activities during maneuver and/or training exercises.
- Discarded or malfunctioned rounds.
- Kick-out from OB/OD activities.

**Maximum Probable Penetration Depth:**

- Although not yet identified within the AOI, if firing lines and target areas are present, penetration of small arms is anticipated to be limited to near the surface.
- Although 75mm MEC has not been identified within the AOI, penetration depths of 75mm projectiles in the adjacent Closed Castner Range have been recorded to 4.5 feet below ground surface (e<sup>2</sup>M, 2007).

**MEC Density:**

- No MEC has yet been observed within the visual survey areas in previous investigations. MEC density is, therefore, anticipated to be low throughout the site.

**Munitions Debris:**

- MD may be randomly scattered across the site.

**Associated Munitions Constituents:**

- Based on published munitions data sheets, potential MC related to 75mm projectiles identified during previous investigations include iron, sulfur, copper, lead, zinc, aluminum, potassium nitrate, and TNT.

**Transport Mechanisms/Migration Routes:**

- There is a potential for MD and MEC to be buried as a result of wind and water erosion.
- Precipitation and runoff from heavy summer monsoon storms may cause flash flooding, accelerating transport and migration of contaminants of concern.
- The fate and transport of a metal in soil depends significantly on the chemical form and speciation of the metal.

**Pathway Analysis:**

- Although not anticipated to be present, the potential for MEC on the surface or in the shallow subsurface does exist within the AOI due to past activities conducted in the adjacent Close Castner Range or from undocumented training activities. Subsurface MEC, if present, could potentially be brought to the surface due to natural erosion processes or weather-related activities such as flooding or frost heave. The pathways for MEC are therefore considered potentially complete at this AOI.
- Potential pathways for MC include soil and sediment. Insufficient sampling has occurred to determine whether MC is present in soil and sediment within the AOI. The pathways for MC are considered potentially complete in the AOI.

## **6. SUMMARY AND CONCLUSIONS**

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The following conclusions are provided as a result of the information reviewed for this HRR.

The AOI North of Castner Range is 7,936 acres located in El Paso County, Texas, and was identified when MD items were found during background sampling activities associated with the adjacent Closed Castner Range. The RI area includes 5,860 acres of the total 7,936-acre AOI due to safety concerns related to steep and mountainous terrain in the western 2,256 acres. The MD was identified mostly in the southern portion of the AOI and included small arms casings, fragments of munitions of unknown type and model, and expended 75mm shrapnel projectiles. USAEC assumed that the MD came from the adjacent Closed Castner Range either as kick-out debris from the OB/OD area or possibly from overshoot during training exercises. The HRR was conducted to document historical and other known information for the AOI North of Castner Range, identify potential range fans that could overlap the AOI, and determine the types of munitions used during military activities.

Research did not identify any range fans that overlapped the AOI, the AOI was never owned or leased by Fort Bliss, and there is no official record of it having been used by Fort Bliss. Any munitions items identified likely came from either early undocumented potential use as a live-fire training area for artillery units or may have been dispersed during demolition explosions from disposal activities in the OB/OD area in the northeastern corner of the adjacent Closed Castner Range.

One of its potential uses as a training site for the 82<sup>nd</sup> Field Artillery Regiment, 82<sup>nd</sup> Field Artillery Battalion, and 1<sup>st</sup> Cavalry Division indicates that it would not have been used before establishing the units in 1916 and not after records indicate the beginning of use of the adjacent Closed Castner Range in 1926. The artillery units would have trained with munitions similar to those identified at the AOI previously—75mm projectiles. The Closed Castner Range, and therefore the OB/OD area, was no longer used after 1966. MEC and MD items potentially present at the AOI from kick-out associated with the OB/OD area would be from 1926 to 1966.

The North FUDS Area was identified in supporting historical documentation provided with the Final MEC Reconnaissance Survey Report (USAESCH, 2015) as a 640-acre area located in the southeastern corner of the AOI North of Castner Range. It contains no former ranges or ordnance use areas. Although this site was not directly used for any Castner Range operations, numerous ordnance items and debris fragments were identified. This site is included in the safety fan of a demolition area in the far north portion of the main Castner Range. It is conjectured that these items may have been dispersed during demolition explosions from disposal activities in the extreme north part of Castner Range.

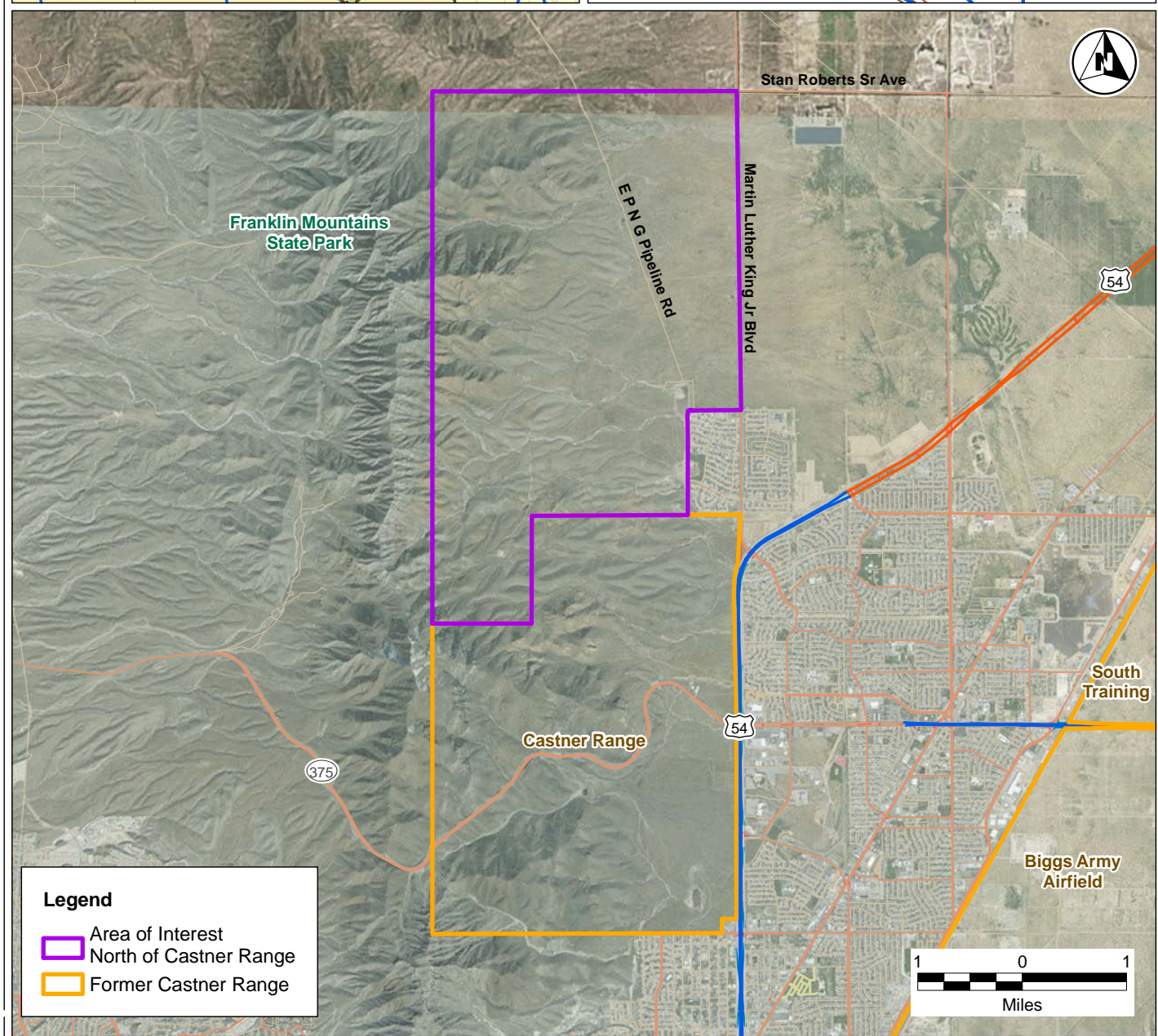
The OB/OD area located just south of the AOI in the Closed Castner Range was identified in the Final Site Inspection Report (e<sup>2</sup>M, 2007). OB/OD Pit B-1 was a former OB/OD pit located at the northernmost boundary of the Closed Castner Range. This pit was identified as a “burn kettle” or “burn pit” exclusively for the destruction of small arms ammunition. The center of the site was a small concrete pit 5 feet by 10 feet with 2-foot high walls open on one side. Several removal actions have been conducted at the OB/OD Pit B-1. Multiple removal actions and investigations have been conducted in the area associated with this OB/OD pit. MEC and MD identified during these activities include, but are not limited to, 20mm projectiles, 40mm projectiles, 3.5-inch rockets, 90mm projectiles, grenades, and small arms munitions. Additionally, previous sampling activities conducted in proximity to the OB/OD area have revealed elevated concentrations of lead and explosives.

## 7. REFERENCES

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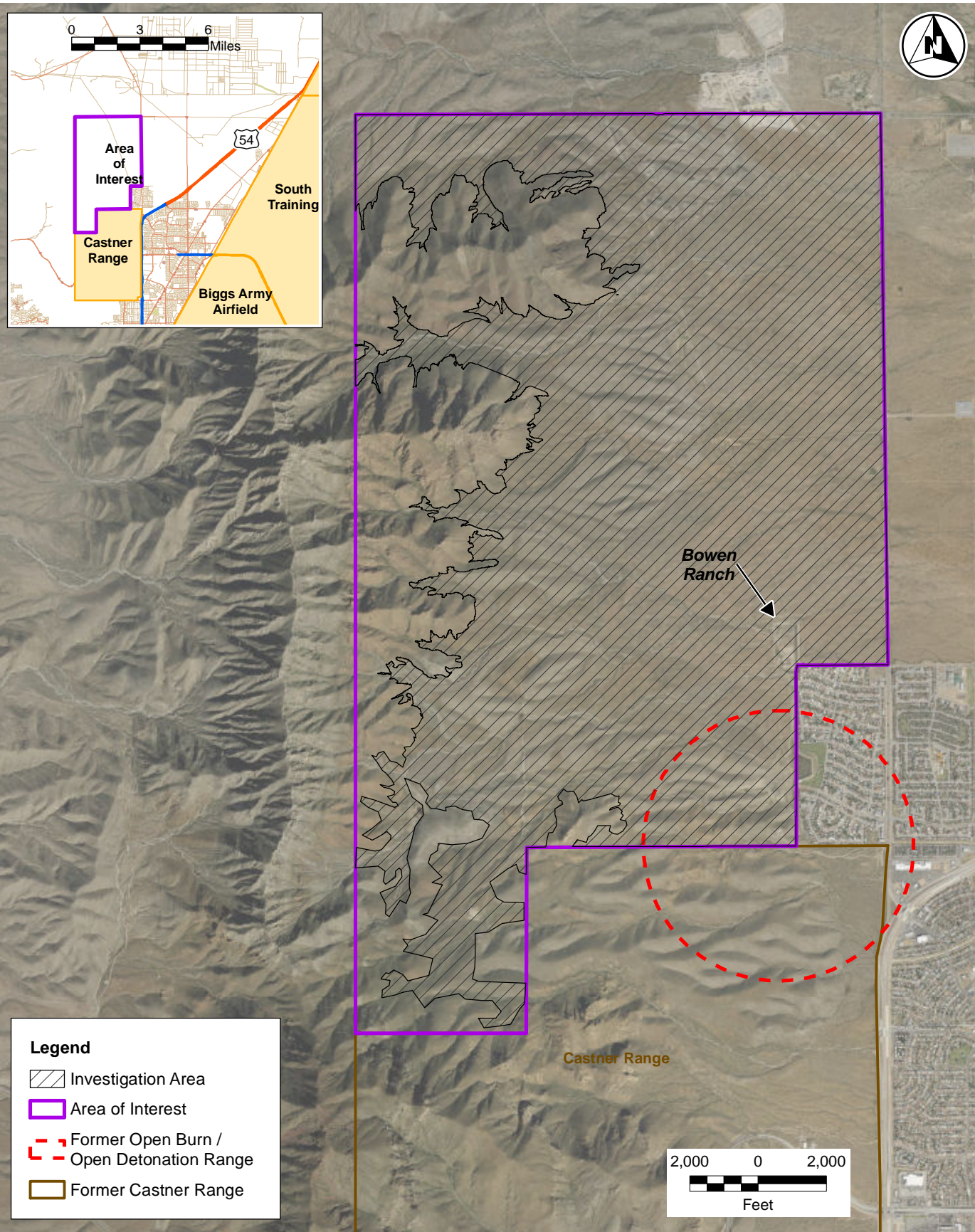
- Cobb, Arthur, date unknown. *First Cavalry Division Artillery*.
- Department of the Army, 1997. *Environmental Protection and Enhancement*, Army Regulation 200-1. February.
- Department of the Army, 2002. *Environmental Protection and Enhancement*, DA PAM 200-1. January.
- Department of the Army, 2004. *Army Defense Environmental Restoration Program: Management Guidance for Active Installations*. November.
- Department of Defense, 2001. *Management Guidance for the Defense Environmental Restoration Program*. September.
- engineering-environmental Management, Inc., 2007. *Final Site Inspection Report, Fort Bliss, Texas*. April.
- Metz, Leon C., 1995. *Desert Army, Fort Bliss on the Texas Border*. Unknown month.
- Parsons Engineering Science, Inc., 1998. *OE Characterization and Cost Analysis Report for Fort Bliss: Castner Range*. May.
- TLI Solutions, Inc., 2011. *Final Site Inspection (SI) Report for Fort Bliss, El Paso, Texas*. March.
- URS Group, Inc., 2013. *Field Demonstration Report of Incremental Sampling Methodology at the Closed Castner Firing Range Fort Bliss, Texas*. June.
- USA Environmental, Inc., 2004. *Final Removal Report, Ordnance and Explosives (OE) Removal Action at Castner Range, Fort Bliss, Texas*. October.
- U.S. Army Corps of Engineers, 2004. *Archives Search Report Supplement*. Unknown month.
- U.S. Army Engineering and Support Center Huntsville, 2015. *Final MEC Reconnaissance Survey Report, Former North Castner Range, El Paso, TX*. June.
- UXB International, Inc., 1997. *Final Report for Castner Range, Fort Bliss, Texas, Unexploded Ordnance (UXO) Removal Action*. April.
- Various unknown authors, 1919. *82<sup>nd</sup> U.S. Field Artillery, 1919*. Unknown month.

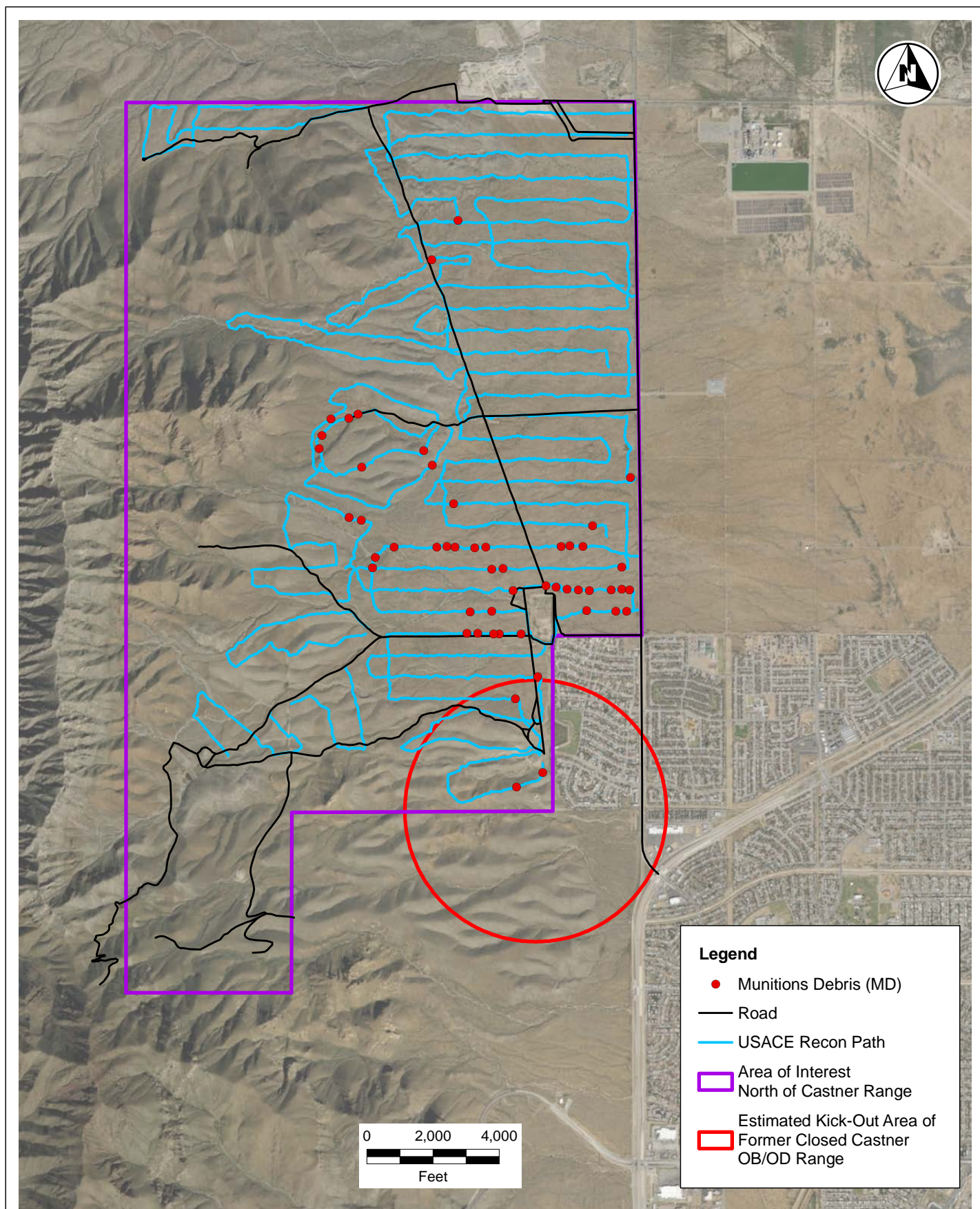
## **FIGURES**



**Area of Interest North of Castner Range**  
USACE - Tulsa District  
El Paso, Texas

**Figure 2-1**  
Site Location Map  
Historical Records Review





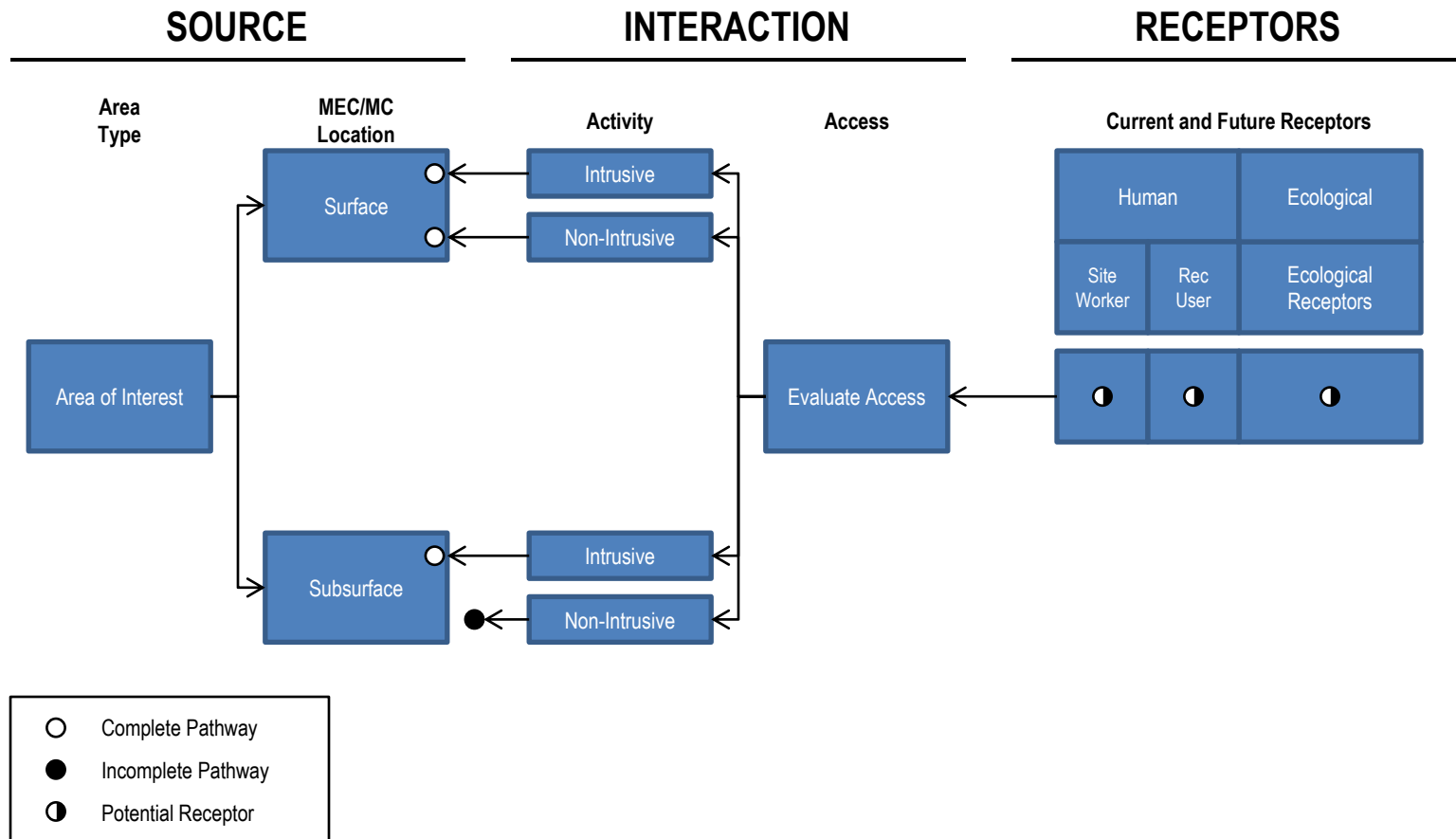


Figure 5-1  
Conceptual Site Model

## TABLES

**Table 4-1**  
**Munitions Debris Identified During MEC Reconnaissance Survey**

<b>Munitions Debris</b>	<b>Number of Items per Location</b>
Smoke Grenade - unknown model	1
Fuze debris - unknown type and model	1
Fragment - medium, unknown type and model	1
Projectile - 75mm Shrapnel	5
Projectile - 75mm Shrapnel	3
Casing - small arms	1
Fragment - medium, unknown type and model	1
Fuze debris - M1907	1
Fragment - medium, unknown type and model	1
Fragment - medium, 75mm Shrapnel, push plate	1
Fragment - medium, 75mm Shrapnel, push plate	2
Fragment - medium, 75mm Shrapnel	4
Fragment - medium, unknown type and model	1
Fuze debris - 75mm Shrapnel	2
Fragment - medium, unknown type and model	1
Casings - small arms	2
Projectile - 75mm Shrapnel	1
Fuze debris - M1907	1
Fuze debris - mortar, unknown type and model	2
Fuze debris - 75mm	2
Fuze debris - M111 and M1907	4
Fragment - medium, unknown type and model	1
Projectile - 75mm Shrapnel	1
Fuze debris - unknown type and model	2
Fragment - medium, unknown type and model	2
Fragment - medium, unknown type and model	2
Projectile - 75mm Shrapnel	1
Fragment - medium, unknown type and model	1
Fragment - medium, unknown type and model	1
Fragment - heavy, unknown type and model	1
Fuze debris - unknown type and model	1
Fragment - light, unknown type and model	1
Fuze debris - unknown type and model	1
Fragment - medium, unknown type and model	1
Fragment - medium, 75mm Shrapnel	1
Fragment - medium, unknown type and model	1
Fragment - medium, unknown type and model	1
Fragment - medium, unknown type and model	1
Projectile debris, unknown type and model	1
Casing - small arms	1
Fragment - medium, unknown type and model	1
Fragment - heavy, unknown type and model	1
Not identified	1
Fuze debris - unknown type and model	1

**Table 4-1**  
**Munitions Debris Identified During MEC Reconnaissance Survey**

<b>Munitions Debris</b>	<b>Number of Items per Location</b>
Fragment - medium, unknown type and model	1
Fuze debris - unknown type and model	1
Fragment - medium, unknown type and model	1
Fuze debris - unknown type and model	1
Casings - small arms	2
Projectile - 75mm Shrapnel	1
Fragment - medium, 75mm Shrapnel, push plate	1
Fragment - medium, unknown type and model	2
Fragment - medium, unknown type and model	1
Fragment - heavy, unknown type and model	1
Fragment - training/practice, unknown model	1
Fragment - training/practice, unknown model	1
Casing - small arms	1
Projectile - 75mm Shrapnel	3
Projectile - 75mm Shrapnel	3
Projectile - 75mm Shrapnel	1
Projectile - 75mm Shrapnel	1
Projectile - 75mm Shrapnel	1
<b>Total</b>	<b>88</b>

**APPENDIX A**

**HISTORICAL SITE MAPS FROM PREVIOUS INVESTIGATIONS**

***Figure A-1. Historical Range Locations and Areas of Concern  
on Castner Range Munitions Response Site (MRS)***



# HISTORICAL RANGE LOCATIONS and AREAS of CONCERN on CASTNER RANGE MRS Fort Bliss, Texas



Figure 6-1



## World War II Ranges

Range 1	Rifle
Range 2	.30 Caliber Machine Gun
Range 3	Rifle
Range 4	Rifle
Range 5	Rifle
Range 6	.30 and .50 Caliber Machine Gun
Range 7	Pistol
Range 8	.30 Caliber Machine Gun
Range 9	37mm Sub-caliber
Range 10	.22 Caliber Landscape
Range 11	Rifle - .30 Caliber
Range 12	Gravity Course Moving Target
Range 13	Field Firing Course
Range 14	Submachine Gun / Shotgun
Range 15	Mortar
Range 28	.22 Caliber Aerial Target
Range 29	Tow Target Course

Three artillery firing points, two located in Range 12 and one in Range 13  
One possible additional firing point in Range 14

## 1950's Ranges

Range 1	Known Distance (KD) 100 and 200 Yard
Range 2	KD 100, 200, and 300 Yard
Ranges 3 & 4	Transition Table VII
Range 5	KD 100, 200, and 300 Yard
Range 6	KD 100, 200, and 300 Yard (unsatisfactory condition)
Range 7	KD 100, 200, and 300 Yard
Range 8	1000-inch and Landscape (unsatisfactory condition)
Range 9	Pistol 15, 25, and 50 Yard
Ranges 10 & 11	1000-inch and Landscape
Range 12	Infiltration
Range 13	Individual Day Training (barbwire entanglements)
Ranges 14A & 14B	500-inch Machine Gun
Range 14C	Attack Course
Range 15	1000-inch and Landscape (unsatisfactory condition)
Range 16	3.5 Rocket Launcher
Range 17	Transition Table VII (225 yards instead of 500 yards)
Range 17A	Transition Table VIII
Range 18	Hand Grenade - Dummy Practice
Range 19	Hand Grenade - Practice
Range 20	Hand Grenade - Live
Ranges 23-25	Close Combat (unsatisfactory, washed out in 1954 flood)
Range 26	Demolition (Consisted of a number of demolition pits)

A subsequent undated document which rescinded the 17 March 1955 range training memorandum list the same ranges but with different numbers. Significant additional information is shown below.

Range 14	3.5-inch Practice Rocket Only Course (target is stationary tank)
Range 18	Dummy and Live Rifle Grenade Course (20 firing points, impact area)
Range 19	Live Grenade Course (10 throwing revetments)

NOTE: The exact locations of the 1950's ranges listed above were not shown in any of the archive documents. Consistency with the range numbering system for the 1940's and 1960's would locate Range 1 in the southeast area of the property with numbers increasing in a northward direction.

- 1930's Features
- 1940's Features
- 1950's Features
- 1960's Features
- Areas of Concern Identified and Referenced in EHSI SI Report, 10 August 1994 (Appendix C-3)
- Castner Range Boundary Prior to 1971 transfer of southeast portion to the city of El Paso
- pre WWII Range Boundary Added to primary map (Plate 5 cited below) based on other historical information (Plate 1 cited below)

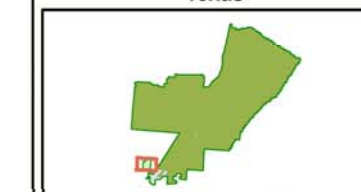
**Data Source:**  
USACE-St. Louis District, Defense Environmental Restoration Program Ordnance and Explosive Waste Archives Search Report, Fort Bliss, Castner Range, El Paso, Texas, El Paso County, August 1994, Archives Search Report Composite Map, Plate 5

USACE Archives Search Report, August 1994, Plate 1

## Approximate Scale:



## Installation Location Texas



## SITE INSPECTION REPORT FORT BLISS, TEXAS

Source: Produced for the U.S. Army Corps of Engineers by engineering-environmental Management, Inc. (eM)

Date: January 2007  
Edition: Final



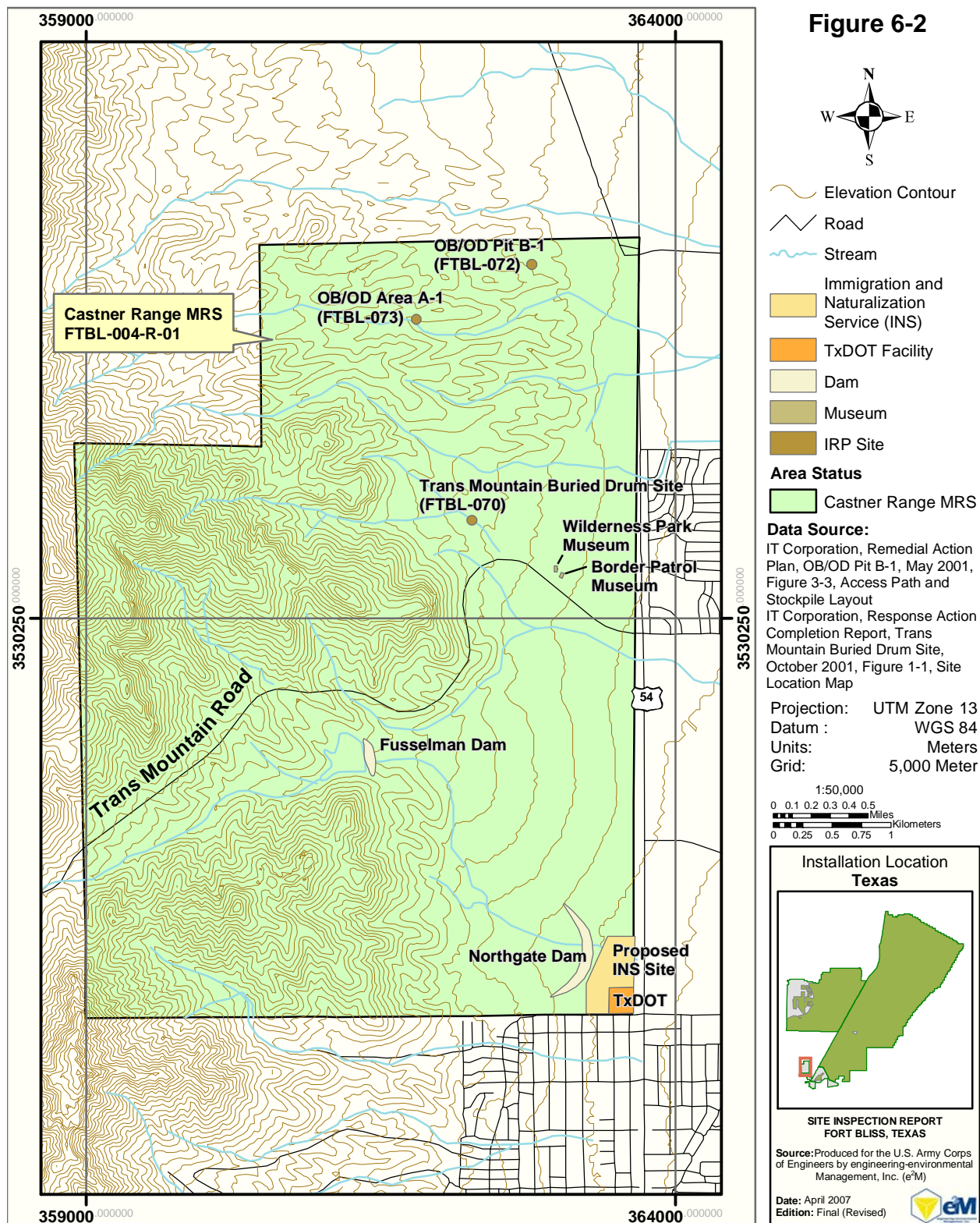
*Figure A-2. Current Structures on Castner Range MRS*



## CURRENT STRUCTURES on CASTNER RANGE MRS Fort Bliss, Texas



Figure 6-2

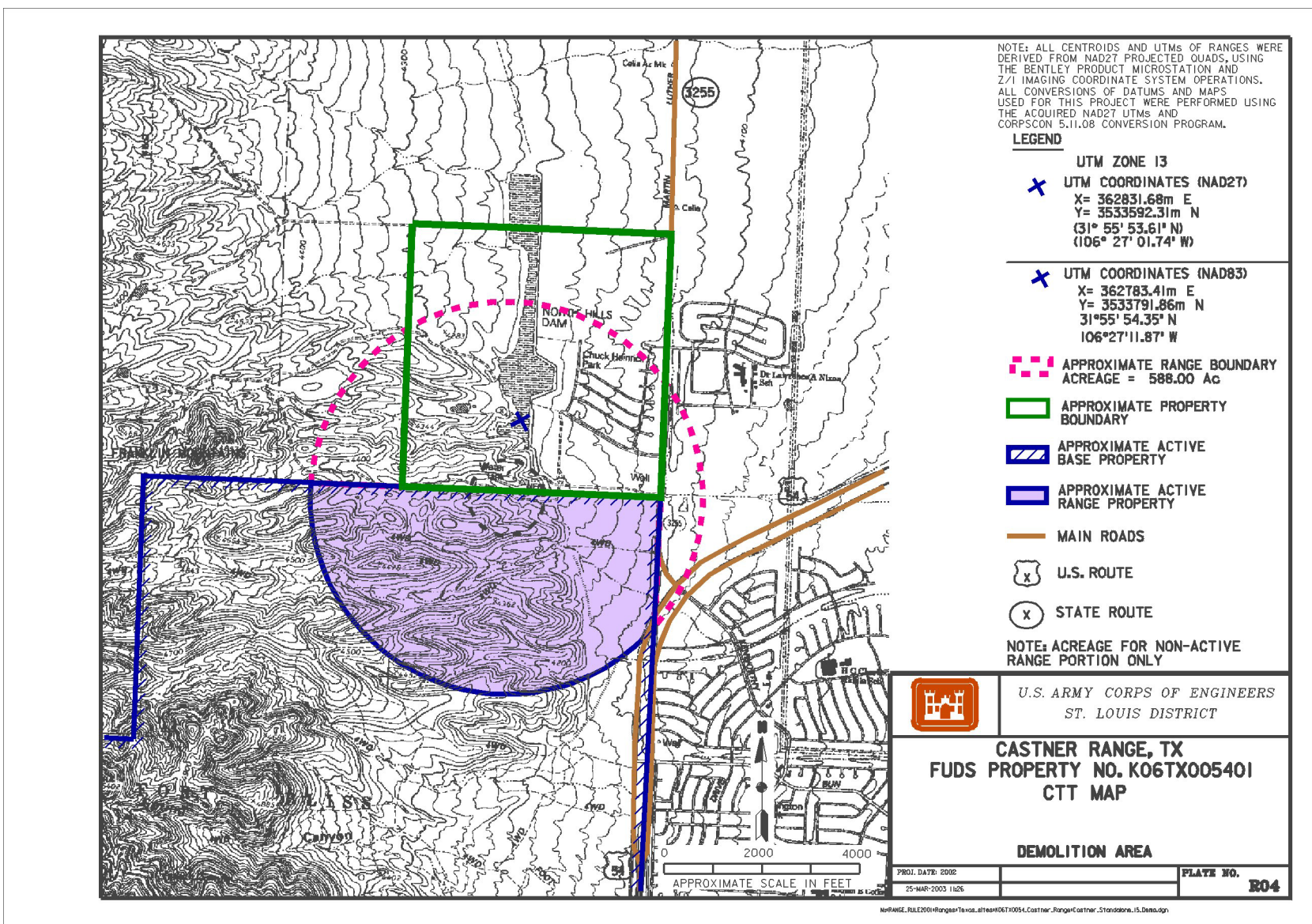


April 2007 (revised)

6-6

USACE Omaha\MMRP\Fort Bliss\Final SI\SI Final Ft Bliss 041607

*Figure A-3. Demolition Area (North FUDS Area)*



RANGE MAP: TX9799F6480\_CTT\_MAP\_04\_20030325.JPG

CASTNER RANGE  
FUDS Property Number: K06TX0054

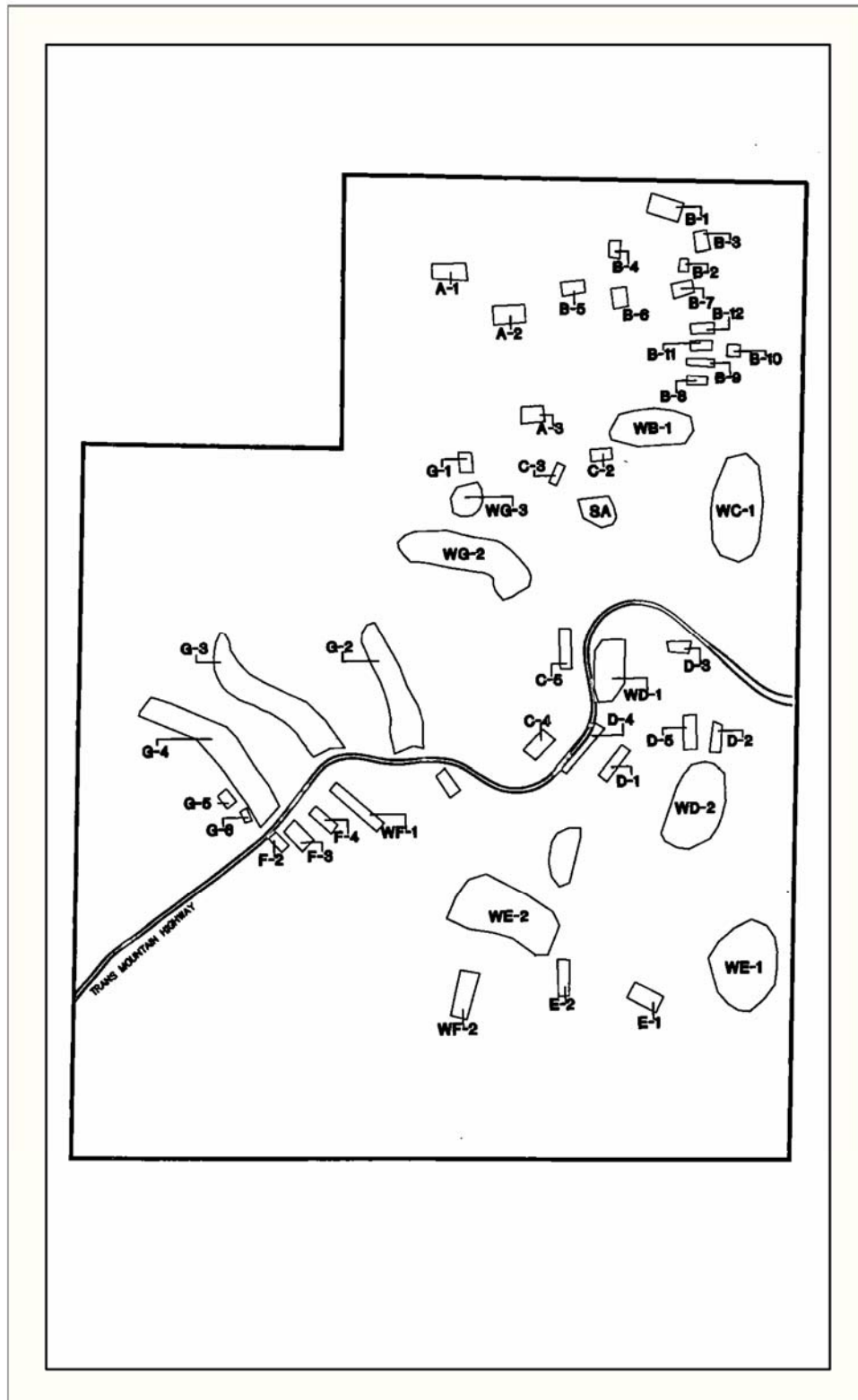
*Figure A-4. EHSI 1994 Investigation Areas on Castner Range MRS*



## EHSI 1994 INVESTIGATION AREAS on CASTNER RANGE MRS Fort Bliss, Texas

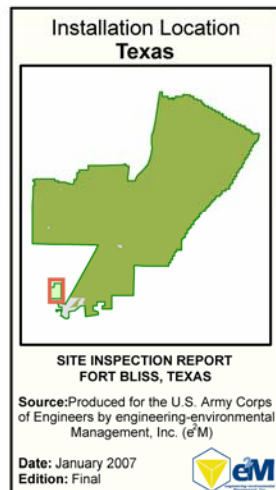


Figure 6-6

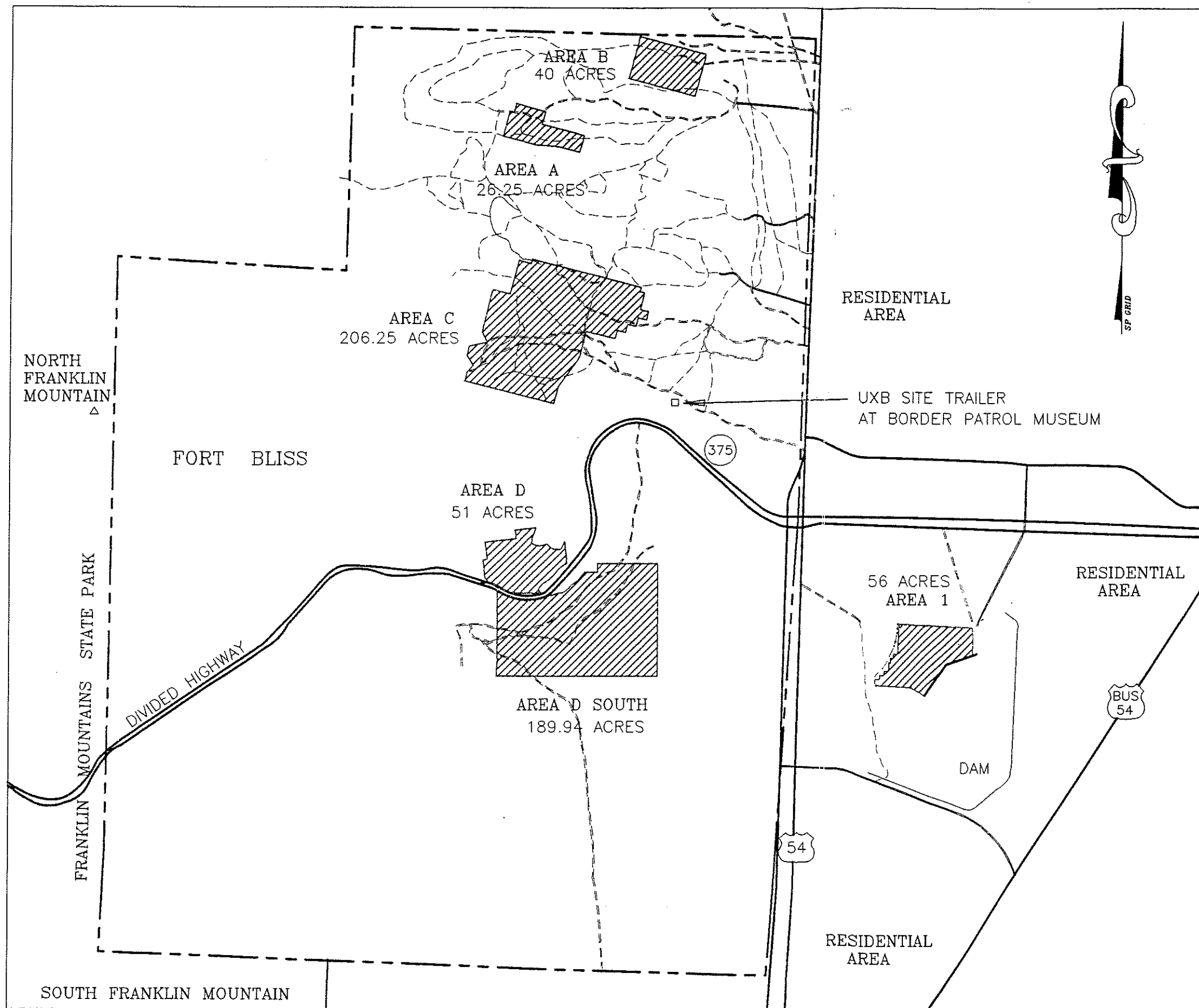


**Data Source:**  
Parsons Engineering Sciences  
Inc., OE Characterization and  
Cost Analysis Report for Fort  
Bliss: Castner Range, May 1998  
Figure 2.2-1, Approximate  
Location of the EHSI Study Areas

Scale Unknown



*Figure A-5. Castner Range (1997 Removal)*



- APPROXIMATE BOUNDARY CASTNER RANGE
- PRIMARY HIGHWAY
- SECONDARY ROAD
- UNIMPROVED ROAD
- TRAIL

Base map digitized from USGS 7.5 minute  
 Quadrangles: North Franklin Mountain, TX 1955  
 Photorevised 1973 & El Paso, TX 1994

## CASTNER RANGE FORT BLISS, TX



FIGURE 2

SCALE: 1:30,000

DATE: 04/02/97

REVISED:

DRAWN BY: SJH/PS

CHECKED BY: JL

SHEET 1 OF 1

File Name: 024SITES.DWG

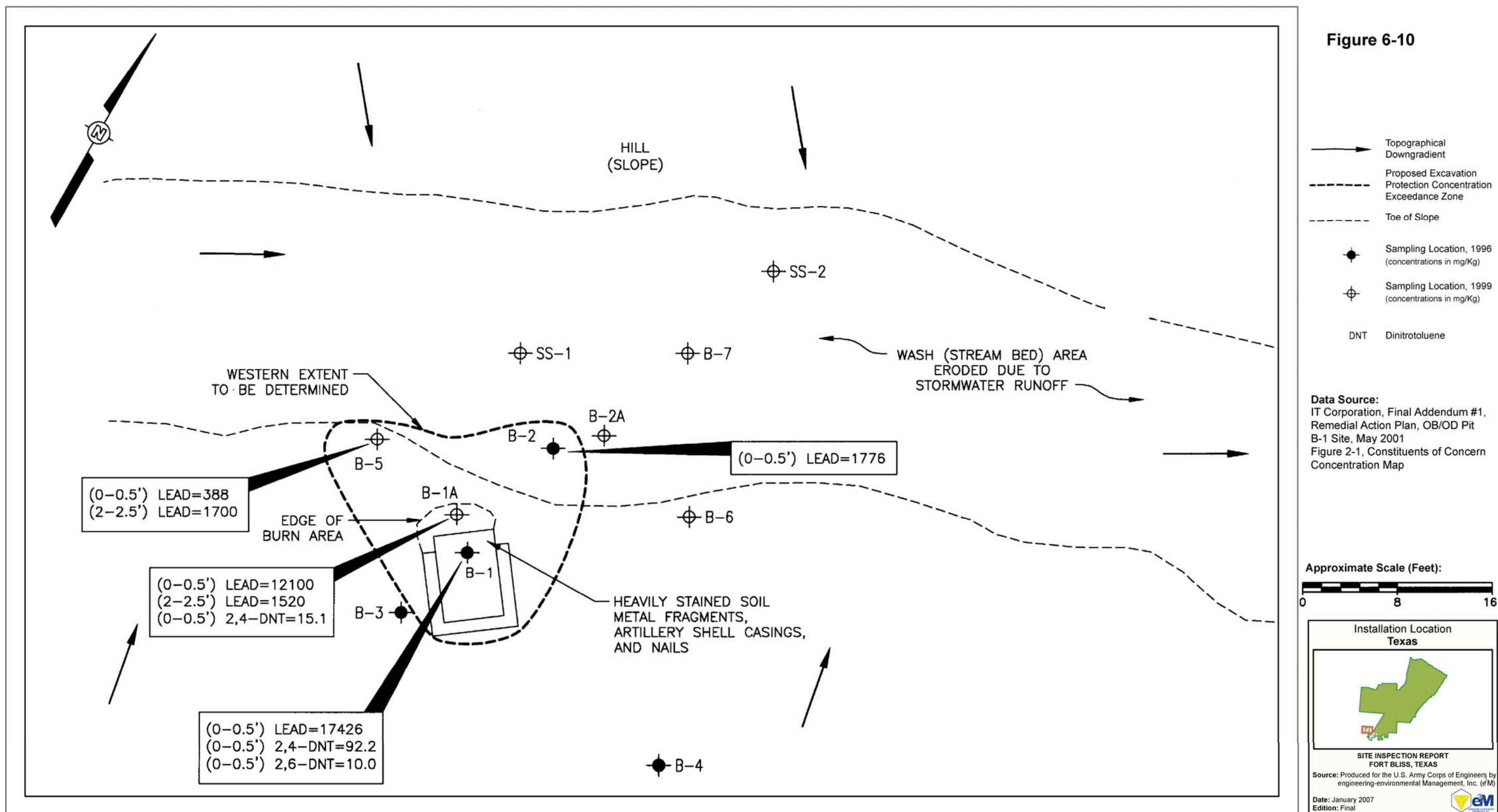
***Figure A-6. USACE 1996 and 1999 Surface Soil Sampling at OB/OD Pit B-1  
on Castner Range MRS***



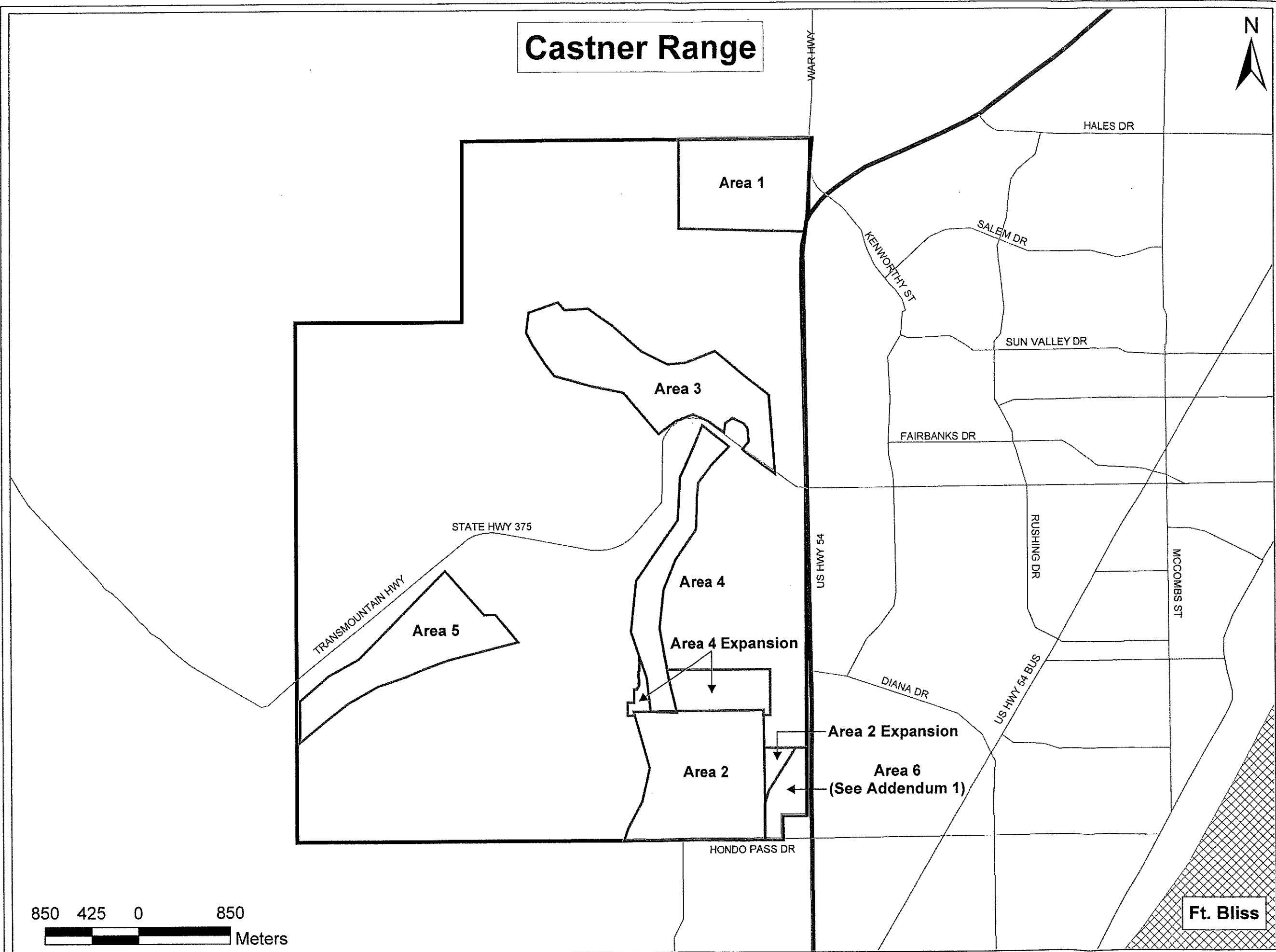
# USACE 1996 and 1999 SURFACE SOIL SAMPLING at OB/OD PIT B-1 on CASTNER RANGE MRS Fort Bliss, Texas



Figure 6-10



*Figure A-7. Castner Range Site Map*



US Army Engineering  
And Support Center,  
Huntsville



Huntsville, Alabama

Rev.	2
Date:	10/4/2004
Designed By:	JAL
Dwn By:	GS
Reviewed By:	GS
Submitted by:	
Design File No.	
Drawing Code:	
Path: c:\projects\castner\castner-alpha.mxd	
Plot Date: 10/4/2004	
Plot Scale: 1" = 850 Meters	

U.S. ARMY ENGINEERING  
AND SUPPORT CENTER  
HUNTSVILLE, ALABAMA

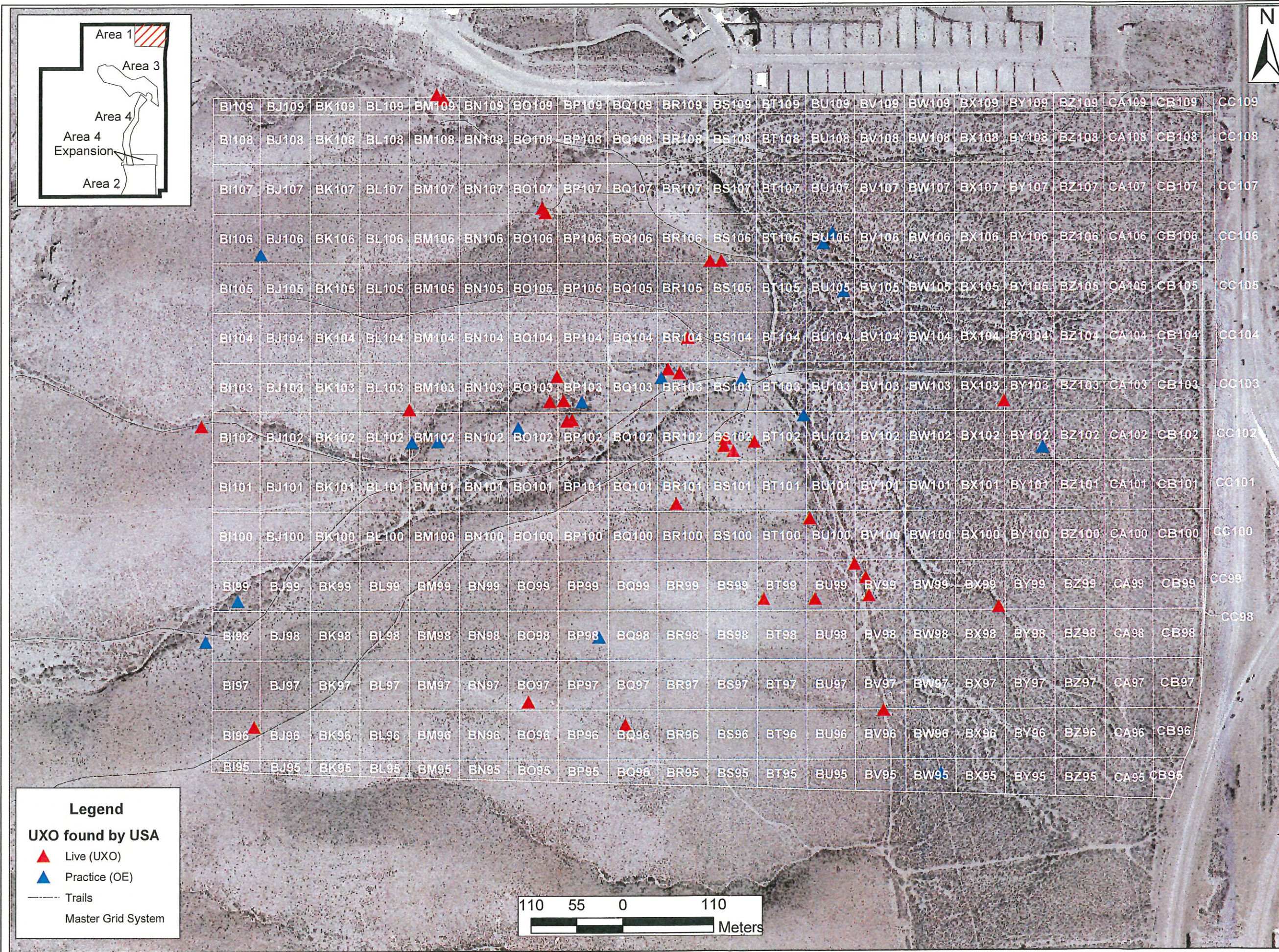
PREPARED BY:  
**USA Environmental, Inc.**  
Tampa, FL

**Castner Range**  
**Figure D-2**  
**Site Map**  
**Ft. Bliss**  
**El Paso Texas**

Contract Number:  
DACA87-00-D-0036

Task Order:  
0014

Sheet 1 of 1



Designed By:	JAL	Rev:	2
Drawn By:	JAL	Date:	01/18/2005
Checked By:	GS	Design File No.:	
Reviewed By:	GS	Drawing Code:	
Submitted by:		Path:	c:\projects\cashter\UXO Area 1.mxd
		Plot Date:	1/18/2005
		Plot Scale:	1" = 110 m

U.S. ARMY ENGINEERING  
AND SUPPORT CENTER  
HUNTSVILLE, ALABAMA

PREPARED BY:  
**USA Environmental, Inc.**  
Tampa, FL

**UXO/OE Found**

**Figure D-5**

**Area 1**

Castner Range El Paso, Texas

*Figure A-8. Phase I Data Exceeding PCLs: Explosives and Metals*

# Phase 1 Data Exceeding PCLs: Explosive and Metals (Except Pb)

Fort Bliss, Texas



*Figure A-9. Phase 1 and 2 Background Soil Sampling Units*

# Phase 1 and 2 Background Soil Sampling Units

Fort Bliss, Texas



## Legend

- Phase 1 Background Sampling Unit
- Phase 2 Background Sampling Unit
- Castner Range MRS
- Target Area Boundary

Data Source: Ft. Bliss and ESRI

Projection: UTM Zone 13

Datum: WGS 84

Units: Meters

Grid: 5,000 Meter

1:38,000



## Installation Location Texas



## IS Field Demonstration Fort Bliss, Texas

Source: Produced for the U.S. Army Environmental Command by URS Group, Inc.

Date: February 2013

Editor: Final

**URS**

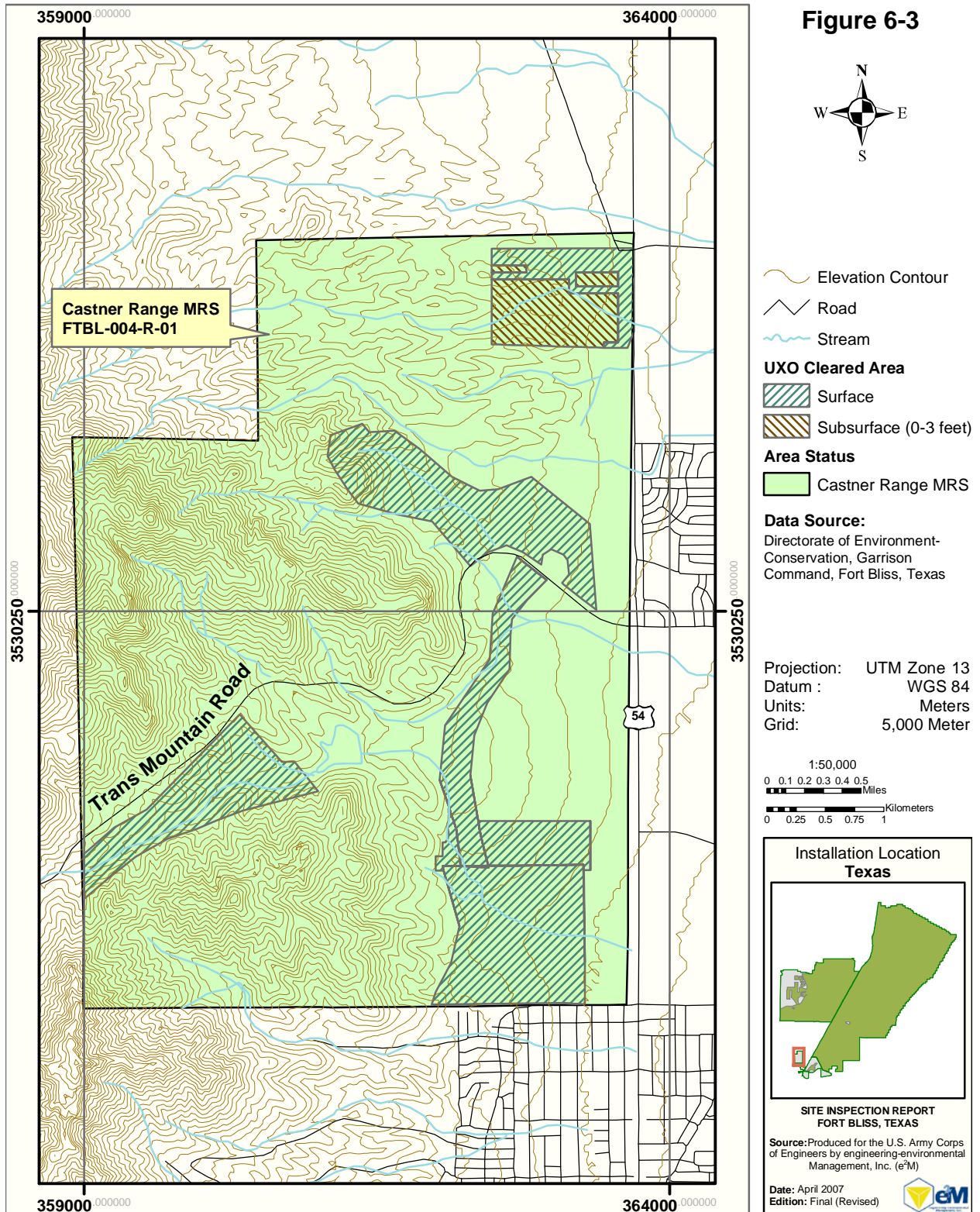
*Figure A-10. UXO Cleared Areas on Castner Range MRS*



## UXO CLEARED AREAS on CASTNER RANGE MRS Fort Bliss, Texas



Figure 6-3



April 2007 (revised)

6-11

USACE Omaha\MMRP\Fort Bliss\Final SI\SI Final Ft Bliss 041607

***Figure A-11. Summary of UXO Removed from Castner Range MRS 1995-2004***



# SUMMARY of UXO REMOVED from CASTNER RANGE MRS 1995-2004 Fort Bliss, Texas



Figure 6-11

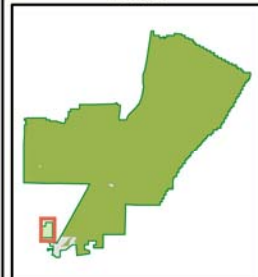


- ▲ UXO found by UXB  
June-Aug 1998
- ▲ UXO found by CMS  
Nov 1996 to May 1997
- ▲ UXO found by USA  
July 2003 to March 2004
- Master Grid System
- Areas Searched by USA
- Castner Range Boundary

**Data Source:**  
USA Environmental Inc.,  
Draft Final Removal Report,  
Ordnance and Explosives  
(OE) Removal Action at  
Castner Range, Fort Bliss,  
Texas, April 16, 2004,  
Figure D-4

**Approximate Scale:**  
650 325 0 650  
Meters

Installation Location  
Texas



SITE INSPECTION REPORT  
FORT BLISS, TEXAS

Source: Produced for the U.S. Army Corps  
of Engineers by engineering-environmental  
Management, Inc. (eM)

Date: January 2007  
Edition: Final



## **APPENDIX B**

### **SOURCES CONTACTED**

## **Appendix B**

### **Sources Contacted**

The following is a list of sources contacted for this Historical Records Review.

#### **U.S. Army Corps of Engineers (USACE)**

##### *USACE – Tulsa District*

Rick Smith  
Project Manager  
(918) 669-4956  
richard.p.smith@usace.army.mil

Frank Roepke  
Technical Manager  
(918) 669-7444  
frank.roepke@usace.army.mil

Mr. Smith, as the USACE Project Manager, and Mr. Roepke, as the USACE Technical Manager, provided the KEMRON Team with project direction and technical support throughout the course of this investigation.

#### **U.S. Army Environmental Command (USAEC)**

Michael Bowlby  
Environmental Restoration Manager  
(210) 466-1686  
michael.a.bowlby.civ@mail.mil

As the USAEC point of contact, Mr. Bowlby provided the KEMRON Team with project direction and contract support throughout the course of this investigation.

#### **Fort Bliss Military Reservation**

Ron Baca  
Environmental Scientist  
Directorate of Public Works – Environmental Division  
(915) 568-7979  
ronald.h.baca.civ@mail.mil

Victor Garcia  
Professional Engineer  
Directorate of Public Works – Environmental Division  
(915) 487-8050  
victor.h.garcia22.ctr@mail.mil

The KEMRON Team met with Mr. Baca and Mr. Garcia on base at Fort Bliss. They provided access to the Directorate of Public Works records library to locate documentation related to the Area of Interest (AOI) North of Castner Range. Research was conducted in the records library during the week of January 16, 2017. Relevant documents were copied and electronic copies are provided in **Appendix C – Supporting Documents**.

Dr. Rafael Corral  
Botanist  
Directorate of Public Works – Environmental Division  
rafael.d.corral.civ@mail.mil

The KEMRON Team met with Dr. Corral regarding federal and state listed endangered and threatened species potentially present within the AOI North of Castner Range. Dr. Corral stated there is no federally protected species habitat located within AOI boundaries; however, there could be state protected species. Dr. Rafael Corral volunteered to review the available list of species and mark which ones could be found on the AOI. No list of AOI specific species has yet been received; however, reporting will be updated as necessary should this information be provided. It should be noted that this investigation has the potential to impact individuals within a species, but this work does not imperil the species. There is a lot of this type of habitat in the northern Chihuahuan Desert.

Suzie Payne  
Archivist  
Directorate of Public Works – Environmental Division  
(915) 568-0772  
maria.s.payne.ctr@mail.mil

The KEMRON Team reviewed maps and documents with Ms. Payne during the week of January 16, 2017. No information relevant to the AOI North of Castner Range was available.

Gary Shell  
Engineering Technician  
Master Planning and Real Property Division  
(915) 569-8700  
gary.shell@us.army.mil

The KEMRON Team visited Mr. Shell during the week of January 16, 2017. Mr. Shell stated that he did not have any information relevant to the AOI North of Castner Range and referred the research team to Mr. Jerry Kummerl.

Jerry Kummerl  
(retired)  
Master Planning and Real Property Division

The KEMRON Team visited Mr. Kummerl during the week of January 16, 2017. Documents, photographs, and maps were reviewed; however, no information relevant to the AOI North of Castner Range was available.

Bonnie Foss  
Master Planning and Real Property Division  
(915) 569-8412

The KEMRON Team visited Ms. Foss during the week of January 16, 2017. Ms. Foss stated that she did not have any information relevant to the AOI North of Castner Range

Range Operations/Explosive Ordnance Disposal (EOD)  
(915) 569-5018

The KEMRON Team called Range Operations while on site during the week of January 16, 2017. It was stated that EOD would not have records related to items found at the AOI North of Castner Range.

John Hamilton  
Curator/Historian  
Fort Bliss Museum  
(915) 568-4421

The KEMRON Team met with Mr. Hamilton at the Fort Bliss Museum on Fort Bliss. He provided access to the records and archives available at the museum to locate documentation related to the AOI North of Castner Range. Research was conducted in the records and archives during the week of January 16, 2017. Relevant documents were copied and electronic copies are provided in **Appendix C – Supporting Documents**.

In addition, Mr. Hamilton provided insight into the potential use of the AOI North of Castner Range. He stated that he believed it was possible the AOI was used by the cavalry regiments in the early 1900s (1910 – 1930) for training; using the Franklin Mountains as a backstop for mountain field guns. The location of this training would have likely gone undocumented given the timeframe. The 82<sup>nd</sup> Field Artillery Regiment, 82<sup>nd</sup> Field Artillery Battalion, and 1<sup>st</sup> Cavalry Division would have been present on Fort Bliss at that time and would have trained with munitions like those identified at the AOI in previous investigations (75mm shrapnel projectiles).

### **Local Government**

*El Paso County Sheriff*  
Records Department  
3850 Justice  
El Paso, TX 79938  
(915) 546-2280

Several attempts to contact and leave messages for Sergeant John Greer by the KEMRON Team during the week of January 16, 2017, were left unanswered. No information was obtained.

*El Paso Police Department*

Records Department  
911 Raynor Street  
El Paso, TX 79903  
(915) 212-4000

The KEMRON Team visited the El Paso Police Department the week of January 16, 2017, to request records pertaining to incidents on the AOI North of Castner Range. No records were available.

**Local Repositories**

*University of Texas – El Paso Library*

Military Collections (6<sup>th</sup> Floor)  
2051 Wiggins Way  
El Paso, TX 79902  
(915) 747-5672

The KEMRON team visited the University of Texas El Paso (UTEP) Library, Military Collections the week of January 16, 2017. Help was sought from the available archivists and identified a number of documents for review. The KEMRON Team took photographs of potentially pertinent documents, maps, and historical photographs. Electronic copies are provided in **Appendix C – Supporting Documents**.

*El Paso Main Library*

El Paso Main Library – Southwest Collection  
501 North Oregon Street  
El Paso, TX 79901  
(915) 212-7323

The KEMRON Team visited the El Paso Main Library the week of January 16, 2017, to review relevant documents. None of the information available was pertinent to the AOI North of Castner Range.

*El Paso County Historical Society*

603 West Yandell Drive  
El Paso, TX 79902  
(915) 533-3603  
info@elpasohistory.com

The KEMRON Team visited the El Paso County Historical Society the week of January 16, 2017, to review relevant documents. None of the information available was pertinent to the AOI

North of Castner Range. However, volunteer historian Trish Long was present at the time of the visit and provided the information described below.

That area has been used for ranching for at least the last 50 years. Ms. Long stated that the community would not be all that concerned with the investigation at the AOI as long as they could still run their cattle, bike their trails, and it continues to be undeveloped. People who live out there are used to the military doing whatever it does. She didn't think the KEMRON Team would be able to find many records on the property and that "old timers" would be the best bet to get information. She stated that people have found spent munitions items out there. The following names and contact information, if available, were provided as potential points of contact.

- Judy Ackerman – Franklin Mountains Wilderness Coalition
- Janae Reneau Field (915-351-9352) – Frontera Land Alliance

She stated the developer of the North Hills West community, the neighborhood adjacent to the AOI North of Castner Range, was Mountain Vista Builders and construction began in 1992. She said the Franklin Mountains State Park acquired the lands in 1979 or 1981, but she didn't know from whom. She thought that it could have been Bureau of Land Management land.

Mickelsen Library  
2 Sheridan Road  
Fort Bliss, TX 79916  
(915) 568-6156

The KEMRON Team visited the Mickelsen Library the week of January 16, 2017, to review relevant documents. None of the information available was pertinent to the AOI North of Castner Range.

### **Personal Interviews**

Mike Santa Maria  
Mountain Vista Builders  
10657 Vista Del Sol Drive  
El Paso, TX 79935  
(915) 855-4690

Mountain Vista Builders built some of the homes in the North Hills West Community, but they bought the lots from Southwest Land Development. The developer would have taken care of all of the preparatory work like getting munitions support, clearing of cultural concerns (archaeology), etc. before the builder would buy the property.

Doug Schwartz  
Southwest Land Development  
6080 Surety Drive, #300  
El Paso, Texas 79905

(915) 592-0290  
www.swlds.net

Southwest Land Development purchased the property in the early 1980s from El Paso Water Utilities. They did an extensive archaeology mitigation study and filed all of the paperwork with the Texas Historical Commission. Mr. Schwartz thinks they may have found one unexploded ordnance (UXO) item (although it could have been another site) and would have called Fort Bliss to take care of it if that was the case.

Mr. Schwartz called again to confirm that no UXO was identified at the North Hills project in El Paso, Texas. He checked the records and verified with others on the project and nothing was found.

Janae Renaud Field  
Frontera Land Alliance  
3800 N. Mesa St., Ste. A2-258  
El Paso, Texas 79902  
(915) 351-8352  
[janae@fronteralandalliance.org](mailto:janae@fronteralandalliance.org)

Ms. Field provided the KEMRON Team with an information sheet and timeline related to the Closed Castner Range that was put together by the Frontera Land Alliance and Franklin Mountains Wilderness Coalition. These documents are included in **Appendix C – Supporting Documents**.

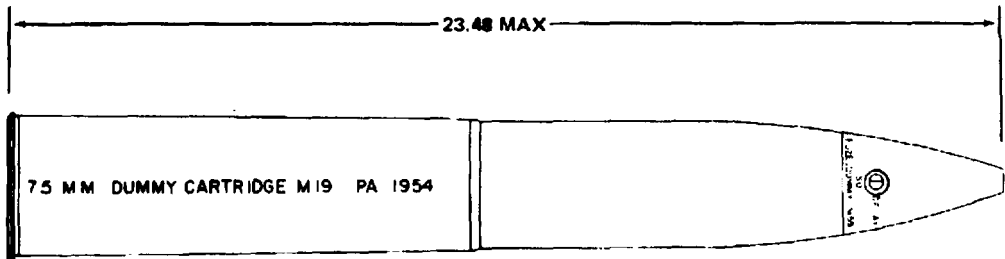
Judy Ackerman  
Franklin Mountains Wilderness Coalition  
(915) 755-7971  
[jpackerman53@gmail.com](mailto:jpackerman53@gmail.com)

Ms. Ackerman did not provide any additional information related to the AOI North of Castner Range.

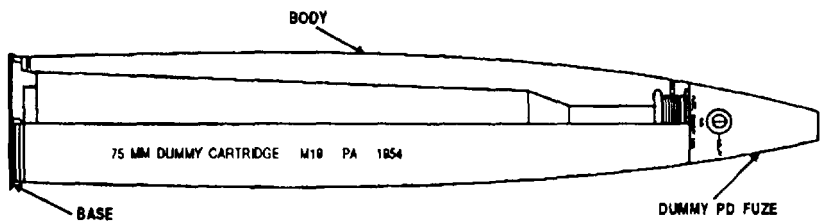
**APPENDIX C**  
**SUPPORTING DOCUMENTS**  
**(Provided on CD)**

**APPENDIX D**  
**MUNITIONS DATA SHEETS**  
**(Provided on CD)**

CARTRIDGE, 75-MILLIMETER: DUMMY, M19 OR M19B1



AR199745



U  
AR 199744

Type Classification:

Obsolete OTCM 37119 dtd 1959.

Use:

Cartridge M19 or the alternative M19B1 is a dummy cartridge used for training purposes. The cartridge is used with 75-mm pack Howitzer M1A1.

Description:

The Cartridge M19 consists of a malleable iron body simulating a service round with projectile, cartridge case and a steel base; all assembled with a dummy fuze. The alternate dummy Cartridge M19B1 has a bronze body. The cartridge base has a plug simulating a primer. The dummy fuze simulates the weight and contour of a PD service fuze.

Functioning:

The cartridge is inert and nonfunctioning.

Tabulated Data:

Complete round:	
Type -----	Dummy
Weight -----	18.24 lb
Length -----	23.48 in.
Cannon used with -----	M1A1
Projectile:	
Body material:	
M19-----	Iron
M19B1 -----	Bronze
Color:	
Old mfg. -----	Black or blue w/white markings
New mfg. -----	Bronze w/white markings
Fuze -----	Dummy M59

\*Packing ----- 1 round per  
fiber container;  
2 fiber contain-  
ers in wooden  
box

\*Packing Box:

Weight ----- 48 lb

Dimensions ----- 28-11/16 x  
9-11/16 x  
6-15/32 in.

Cube ----- 1.04 cu ft

\*NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN's.

**Shipping and Storage Data:**

DOT desiccation ----- DRILL  
CARTRIDGES  
INERT

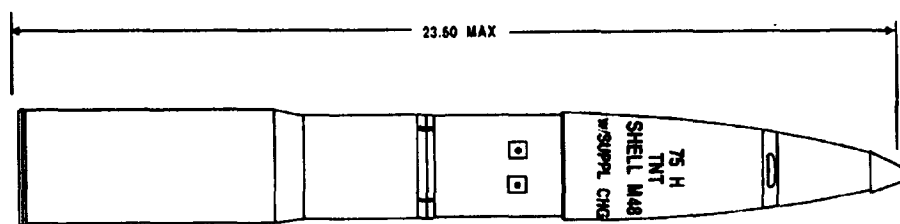
DODAC ----- 1315-C033

Drawing number ----- 72-3-8

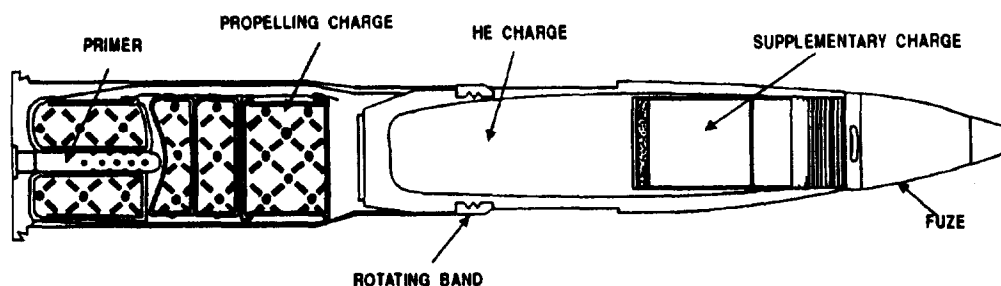
**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1300-251-20

# CARTRIDGE, 75-MILLIMETER HE, M48



U  
AR 199747



U  
AR 199746

## Type Classification:

OBS MSR 11756003.

## Use:

Cartridge M48 is a high explosive type round used for fragmentation, mining, and blast effects. The cartridge is used in 75-mm Howitzer M1A1.

## Description:

The projectile of this cartridge is loosely assembled in the cartridge case because of the necessity for removal to adjust the propelling charge. The projectile is made with either a normal or deep fuze cavity. The deep fuze cavity type may be issued with or without a supplementary charge. As issued, the projectile may be fuzed or assembled with a closing plug. Impact, mechanical time-superquick, or proximity fuzes may be used. The propelling charge consists of a four-increment charge (base charge plus three increments) assembled in the cartridge case. A percussion primer is fitted in the base of the cartridge case.

## Functioning:

When the percussion primer is struck by the firing pin of the weapon, a small amount of black powder in the primer tube is ignited. Sparks and flame from the black powder ignite the propelling charge. Gases from the burning propelling charge drive the projectile through the bore of the weapon. Spin is imparted to the projectile by the engagement of the rotating band with the rifling in the bore. This spin stabilizes the projectile in flight. When the fuze functions, either over or on the target, the bursting charge detonates with both blast and fragmentation effect.

## Tabulated Data:

### Complete round:

Type .....	HE
Weight .....	18.24 lb
Length .....	23.50 in.
Cannon used with .....	M1A1

### Projectile:

Body material .....	Forged steel
Color .....	Olive drab w/yellow markings
Filler and weight .....	TNT or 50/50 amatol, 1.49 lb

**Components:**

Cartridge case ----- M5A1, M5A1B1  
 Propelling charge ----- M1  
 Primer ----- M1, M1A1,  
 M1A2, M1B1A2  
 or M64

**Fuze:**

PD ----- M557  
 PROX. ----- M513 series  
 MTSQ ----- M520 series,  
 M564

**Performance:**

Maximum range ----- 8796 meters  
 Muzzle velocity ----- 1250 fps

**Temperature Limits:****Firing:**

Lower limit ----- -40°F  
 Upper limit ----- +125°F

**Storage:**

Lower limit ----- -80°F (for period  
 not more than 3  
 days)  
 Upper limit ----- +160°F (for  
 period not more  
 than 4 hr/day)  
 \*Packing ----- 1 round per  
 fiber container;  
 2 fiber contain-  
 ers per wooden  
 box

**\*Packing Box:**

Weight ----- 53.0 lb  
 Dimensions ----- 27-15/16 x 9-5/8  
 x 6-11/32 in.  
 Cube ----- 1.01 cu ft

**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

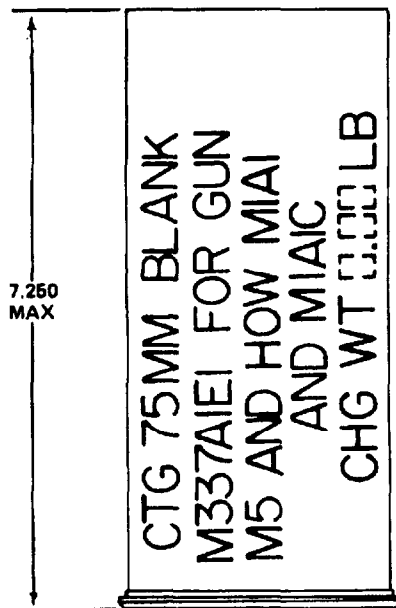
Quantity-distance class ----- 4  
 Storage compatibility  
 group ----- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH  
 EXPLOSIVE  
 PROJECTILES  
 DODAC ----- 1315-C027 -  
 w/PD fuze,  
 1315-C028 - w/o  
 fuze  
 UNO serial number ----- 0321  
 UNO proper shipping name --- Cartridges for  
 weapons  
 Drawing number ----- 75-1-59

**Operational Characteristic**

When assembling an impact or mechanical time fuze to a deep cavity projectile, assure that a supplementary charge is installed, as some deep cavity projectiles do not contain a supplementary charge when issued.

**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1300-251-20

**CARTRIDGE, 75-MILLIMETER: BLANK, M337A2 (M337A1E1), M337A1 AND M337**

AR199867

**Type Classification:**

Std AMCTC 4371 dtd 1966 (M337A2)  
CON MSR 11756003 (M337A1) Std OTCM  
36841 dtd 1958 (M337)

**Use:**

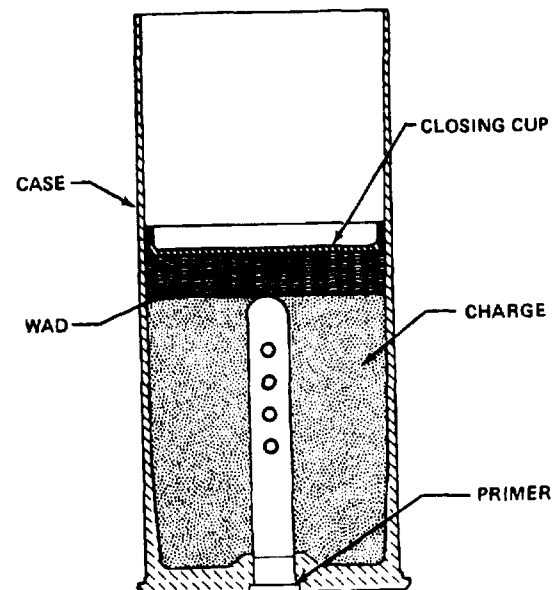
These cartridges are provided for saluting and simulated firing.

**Description:**

Cartridge M337A2 (M337A1E1) consists of a cartridge case of brass or aluminum containing loosely packed black powder (potassium nitrate) and a press-fitted percussion primer. A fiberglass wad is inserted over the black powder and a polystyrene closing cup is cemented in place with a polyester resin adhesive.

**Functioning:**

When the firing pin of the weapon strikes the primer, a flash is generated which ignites the black powder charge producing flash, smoke, and a loud report to simulate weapon firing.



AR199866

**Difference Among Models:**

Cartridges M337A1 and M337 have brass cartridge cases containing a charge of black powder (sodium nitrate or potassium nitrate) in a cotton bag, and a press-fitted percussion primer. A hair felt wad is inserted over the cotton bag, and a chipboard closing cup is cemented in place with pettman cement.

**Tabulated Data:****Complete round:**

Type .....	Blank
Weight .....	3.25 lb
Length .....	7.25 in.
Cannon used with .....	M116, M120, M1A1, M1A1C, M3

**Components:**

Body material .....	Brass or aluminum
Filler and weight .....	Potassium nitrate or sodium nitrate -1 lb

Cartridge case ----- M337A2  
(M337A1E1);  
M9A1, M9A1E1,  
M337A1, M337;  
M9A1, M18  
(modified)  
Primer ----- M1B1A2

### **Temperature Limits:**

Firing:  
Lower limit----- -40°F  
Upper limit----- +125°F  
Storage:  
Lower limit----- -80°F (for period  
not more than 3  
days)  
Upper limit----- +160°F (for  
period not more  
than 4 hr/day)  
\*Packing ----- 1 round per  
fiber container;  
15 containers  
per wooden box  
\*Packing Box:  
Weight ----- 74 lb  
Dimensions----- 22-13/16 x 13-  
7/18 x 10- 17/32  
in.  
Cube----- 1.9 cu ft

**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

### **Shipping and Storage Data:**

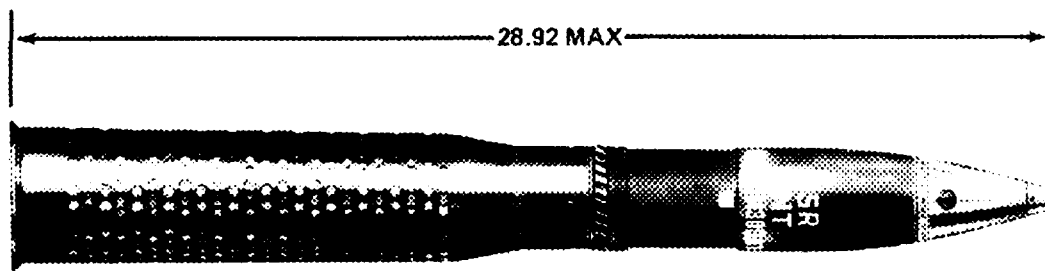
Quantity-distance class ----- 4  
Storage compatibility  
group----- E  
DOT shipping class----- B  
DOT description----- AMMUNITION  
FOR CANNON  
WITHOUT  
PROJECTILES  
DODAC ----- 1315-C025  
UNO serial number ----- 0327  
UNO proper shipping name --- Cartridges for  
weapons, blank  
Drawing number ----- 7549273

### **Limitations:**

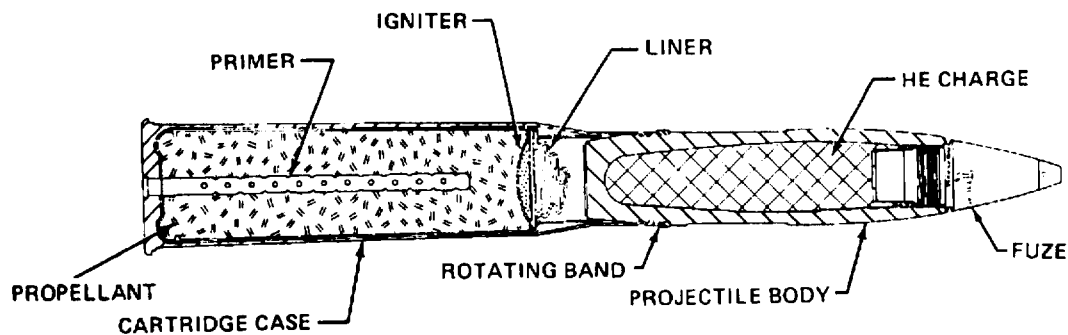
Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

### **References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1300-251-20

**CARTRIDGE, 75-MILLIMETER: HE, M309A1 AND M309**

AR199767



AR199766

**Type Classification:**

Cont OTCM 37119 dtd 1958.

**Use:**

This cartridge is fired from 75mm recoilless rifles and is used for blast, fragmentation, and mining effects.

**Description:**

The cartridge consists of a perforated metal cartridge case crimped to a hollow steel projectile. The cartridge case contains a plastic liner which is filled loosely with propellant. An igniter charge is positioned on top of the propellant. A percussion primer is fitted in the base, with an igniter tube extending through the propelling charge. The projectile is fitted with either a point detonating or mechanical time, superquick fuze in the nose, and is filled with TNT. The rotating band near the base is pre-engraved to match the bore rifling of the weapon. A bourrelet at the rear of the ogive and another forward of the rotating band are provided as bearing surfaces for the projectile in the rifle bore.

**Functioning:**

When the weapon firing pin strikes the primer, flame from the primer black powder ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the rifle barrel and to the target. Recoil is eliminated because some gas pressure escapes through the perforated cartridge case, and is controlled by apertures in the rifle breech-block. The rotating band engages the bore rifling to spin the projectile for stability in flight. On impact, fuze functioning detonates the high explosive, producing blast and fragmentation.

**Difference Between Models:**

M309 has a paper-lined cartridge case, and does not have the igniter charge on top of the propelling charge.

**Tabulated Data:**

Complete round:

Type .....	HE
Weight with fuze .....	22.37 lb
Length with fuze .....	28.92 in.
Cannon used with .....	M20

**Projectile:**

Body material ----- Forged steel  
 color ----- Olive drab  
 w(yellow  
 markings  
 Filler and weight ----- TNT, 1.49 lb

**Components:**

Cartridge case:  
 M309A1 ----- M31A1  
 M309 ----- M31  
 Propelling charge ----- M10  
 Primer ----- M47B2 or  
 M47  
 Fuze ----- PD, M51  
 Series or  
 M557; MTSQ,  
 M520A1

**Performance:**

Maximum range ----- 6364 m  
 Muzzle velocity ----- 990 fps

**Temperature Limits:****Firing:**

Lower limit ----- -40°F  
 Upper limit ----- +125°F

**Storage:**

Lower limit ----- -80°F (for not  
 more than 3  
 days)  
 Upper limit ----- +160°F (for  
 not more than  
 4 hr/day)

\*Packing ----- 1 <sup>cartridge</sup> in  
 fiber con-  
 tainer; 2 con-  
 tainers in  
 wooden box

**\*Packing Box:**

Weight ----- 73.0 lb  
 Dimensions ----- 34-1/4 x  
 11-5/16  
 x 7-9/32 in.  
 Cube ----- 1.64 cu ft

\*NOTE: See DOD Consolidated Ammunition  
 Catalog for complete packing data including  
 NSN's.

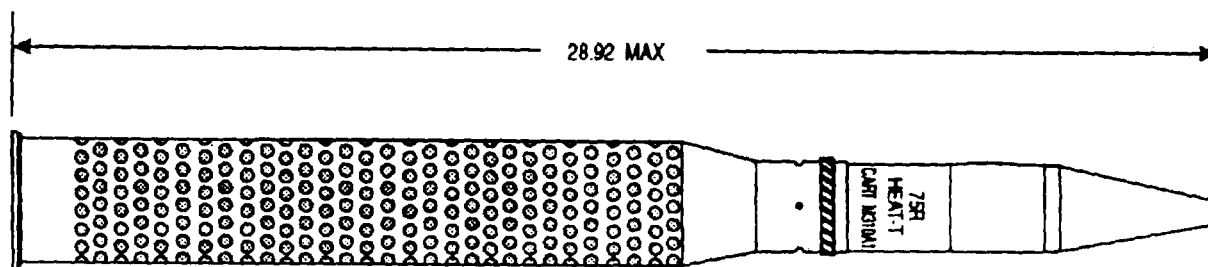
**Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (08)1.2  
 Storage compatibility group ----- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNI-  
 TION FOR  
 CANNON  
 WITH EX-  
 PLOSIVE  
 PROJECT-  
 ILES  
 DODAC ----- 1315-C051  
 Drawing number ----- 75-1-221

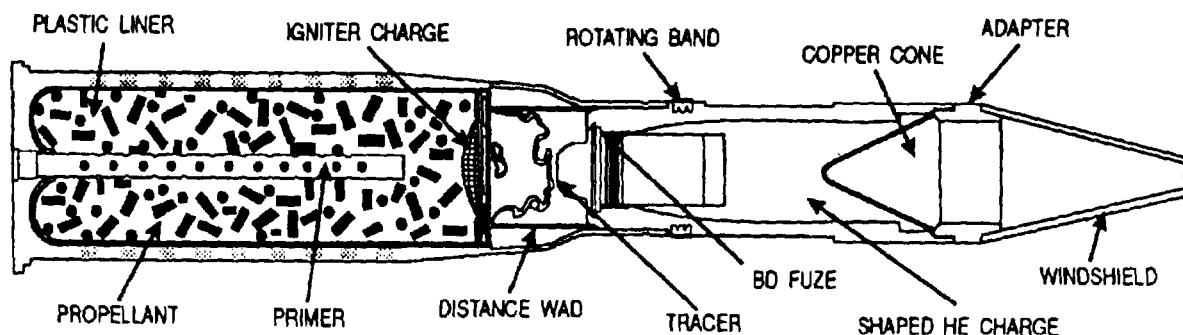
**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1300-251-20

# CARTRIDGE, 75-MILLIMETER: HEAT-T M310A1 AND M310



U  
AR 199763



U  
AR 199762

## Type Classification:

### Use:

This cartridge is fired in 75mm recoilless rifles against armored targets.

### Description:

This cartridge consists of a perforated metal cartridge case, containing a plastic liner, crimped to a high explosive antitank projectile. The liner is loosely filled with propellant, with an igniter charge on top, and all retained by a distance wad. A percussion primer is fitted in the base with an igniter tube extending through the propelling charge. The hollow steel projectile of M310A1 is filled with Composition B around an internal copper cone to shape the charge. The nose of the shell is covered by a windshield threaded to a steel nose adapter. The space within the cone, adapter, and windshield provide the appropriate stand-off distance for the shaped charge. The base of the projectile carries a base-detonating fuze. A rotating band near the base is pre-engraved to match the weapon rifling.

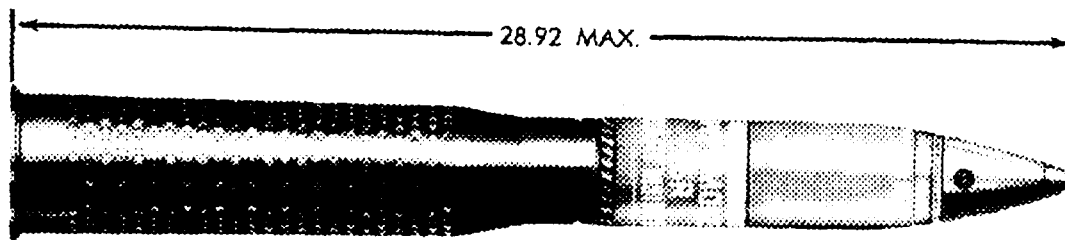
## Functioning:

The primer ignites the propelling charge when struck by the firing pin of the weapon. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel. Recoil is eliminated because some of the gas pressure escapes through the perforated cartridge case and release is controlled through apertures in the breech-block of the rifle. The propelling charge also ignites the tracer in the BD fuze to provide visibility of the trajectory. The rotating band engages the barrel rifling to spin the projectile for stability in flight. On impact, the fuze functions to detonate the shaped charge and collapse the internal cone. This action generates a focussed high velocity shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior of the target.

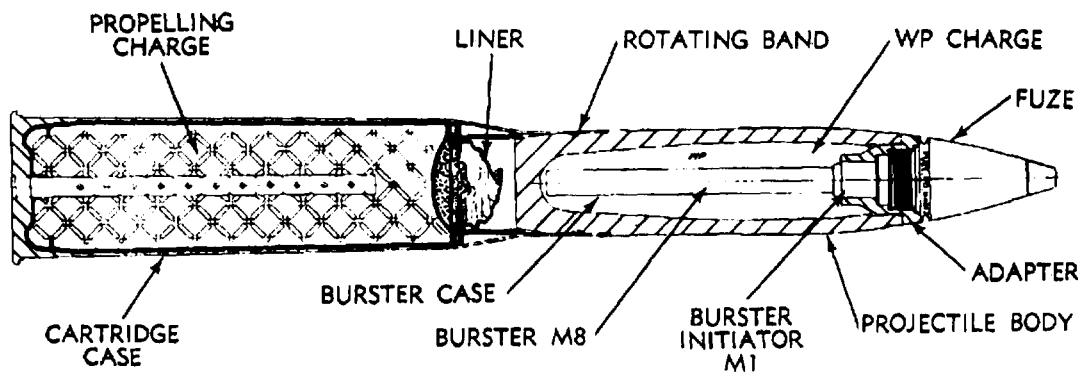
## Difference Between Models:

M310 has a paper-lined cartridge case and the projectile is 50/50 pentolite loaded. There is no igniter charge in the propelling charge.



**CARTRIDGE, 75-MILLIMETER: SMOKE, WP, M311A1 and M311**

AR 199765



AR 199764

**Type Classification:**

Cont OTCM 37119 dtd 1959.

**Use:**

This cartridge is used in 75mm recoilless rifles for screening and spotting.

**Description:**

The cartridge consists of a perforated metal cartridge case containing a plastic liner which is crimped to a hollow steel projectile. The liner is filled with loose propellant and an igniter charge is positioned on top of the propellant. A percussion primer is assembled in the base of the cartridge case. The igniter tube of the primer extends through the propelling charge. The projectile is filled with white phosphorous. The projectile has a pre-engraved rotating band near the base. Two bourrelets, one behind the ogive and one just ahead of the rotating band, provide bearing surfaces for the projectile in the weapon barrel. An adapter at the nose accommodates the burster tube and is threaded to accept the point detonating fuze.

The burster tube holds a tetryl charge and is press-fitted into the adapter to seal in the WP projectile contents.

**Functioning:**

The primer ignites the propelling charge when struck by the weapon firing pin. Rapidly expanding gases from the burning propellant provide the force to propel the projectile through the barrel and to the target. Recoil is eliminated because the cartridge case design permits controlled escape of some gas pressure through apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile. On impact, the fuze detonates the burster charge to rupture the projectile and disperse the white phosphorous. WP ignites spontaneously on contact with air and produces a dense white smoke.

**Difference Between Models:**

M311 has a paper-lined cartridge case, and does not have the igniter charge on top of the propelling charge.

**Tabulated Data:****Complete round:**

Type .....	Smoke (WP)
Weight .....	23.20 lb
Length .....	28.92 in.
Cannon used with .....	M20
Projectile: .....	
Body material .....	Forged steel
Color .....	Gray w/yellow band and yellow markings
Filler and weight .....	WP, 1.35 lb
Burster casing .....	M6: initiator M1 and burster M8, 1.01 oz. tetryl

**Components:**

Cartridge case	
M311A1 .....	M31A1
M311 .....	M31
Propelling charge .....	M10
Primer .....	M47B2 or M47
Fuze .....	PD, M48A3, M57 (MOD)

**Performance:**

Maximum range .....	6364 m
Muzzle velocity .....	990 fps

**Temperature Limits:****Firing:**

Lower limit .....	-40°F
Upper limit .....	+125°F

**Storage:**

Lower limit .....	-80°F (for not more than 3 days)
Upper limit .....	+160°F (for not more than 4 hr/day)

* Packing .....	1 cartridge in fiber container; 2 containers in wooden box
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**\*Packing Box:**

Weight .....	73.0 lb
Dimensions .....	34-1/4 x 11-15/16 x 7-9/32 in.
Cube .....	1.64 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

Quantity-distance class .....	(12) 1.2
Storage compatibility group .....	H
DOT shipping class .....	A
DOT designation .....	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC .....	1315-C056
Drawing number .....	75-1-225

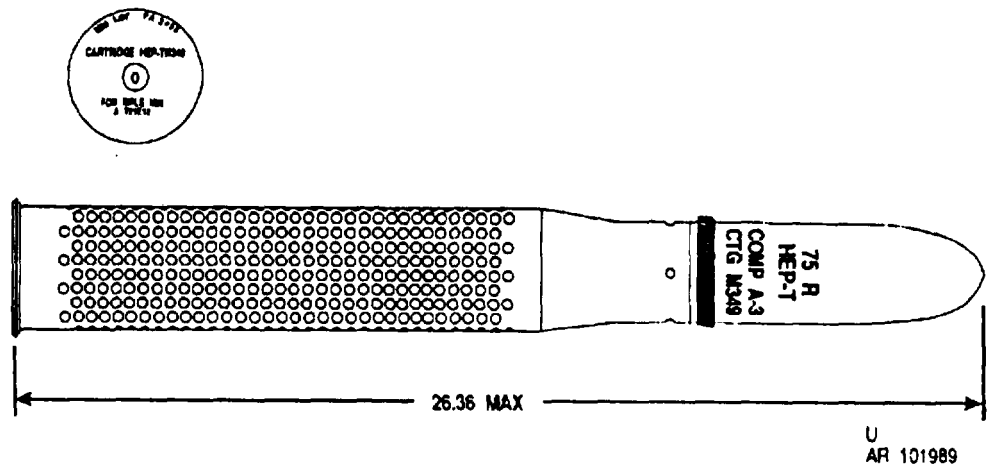
**Limitations:**

Rounds should be stored and transported on their bases when temperatures exceed 111.4°F, the melting point of WP, to avoid cavities in the filler.

**References:**

B 700-20  
MC-P 700-3-3  
M 9-1300-251-20

CARTRIDGE, 75-MILLIMETER: HEP-T, M349



**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge is designed for use against armored targets light materiel and personnel.

**Description:**

The complete round consists of a thin steel projectile with an internally threaded base, assembled to a perforated steel cartridge case. The projectile contains a filler of 2.55 pounds of Composition A3 and employs a base-detonating fuze. The cartridge case contains a propelling charge of single-perforated propellant, and an igniter charge, both of which are sealed in a double rayon/plastic liner, a percussion primer is positioned in the base of the cartridge case.

**Functioning:**

When the weapon is fired, the firing pin strikes the primer which ignites the propellant. The propellant creates gases that force the projectile out of the tube and propel it to the target. The tracer is also ignited and burns during the early stages of flight. On impact, the functioning of the fuze detonates the explosive.

**Tabulated Data:**

Complete round:  
Type ----- HEP-T  
Weight ----- 16.52 lb  
Length ----- 26.36 in.

Cannon used with ----- M20 + T21E12  
Projectile:  
Explosive filler ----- 2.55 lb Comp A 3  
Body materiel ----- Steel  
Color ----- Olive drab w/yellow markings and black bands  
Cartridge case ----- M31A1  
Primer ----- M47 or M47B2  
Propellant:  
Type ----- M10  
Weight ----- 3.36 lb  
Tracer ----- Integral w/fuze  
Fuze BD----- M91A1

**Ballistics:**

Maximum range ----- 7,180 yd;  
6,570 m  
Muzzle velocity ----- 1400 fps

**Temperature Limits:**

Firing:  
Lower limits ----- -40°F  
Upper limits ----- +125°F  
Storage:  
Lower limits ----- -80°F (for periods of not more than 3 days)  
Upper limits ----- +160°F (for periods of not more than 4 hr/day)

\*Packing ----- 1 cartridge per  
fiber con-  
tainer; 2 con-  
tainers per  
wooden box

<sup>4b</sup> Packing box:  
Weight filled ----- 95 lb  
Dimensions OD ----- 32 x 11-5/16 x  
7-9/32 in.  
Cube ----- 1.52 cu ft

\*NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN's.

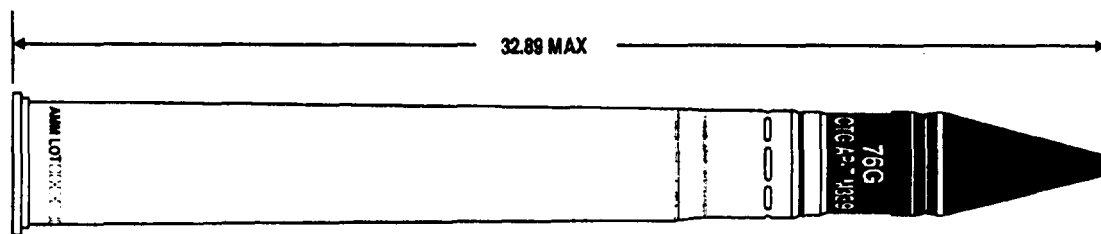
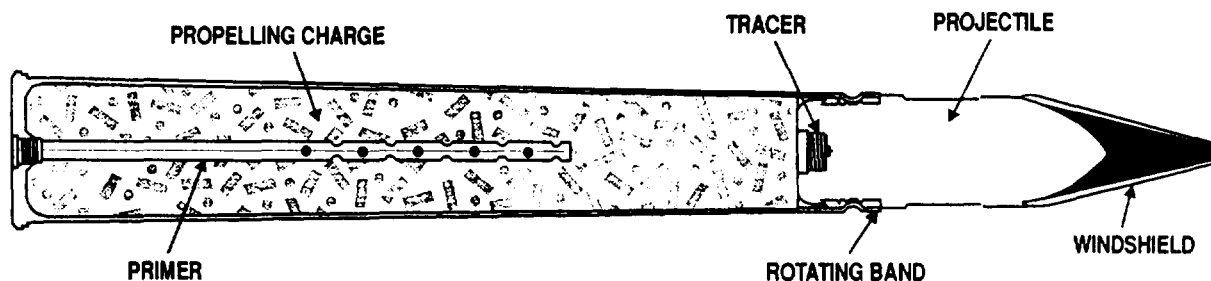
**Shipping and Storage Data:**

UNO serial number -----	0006
Quantity-distance class -----	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C053
Drawing number -----	75-1-32

**References:**

AMC-P 700-3-3

## CARTRIDGE, 76 MILLIMETER: AP-T, M339

U  
AR 199863U  
AR 199862**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed cartridge is designed for use in 76mm guns against armored targets.

**Description:**

The solid tungsten carbide projectile is fitted with a lightweight windshield to provide a better ballistic shape. A tracer is located at the base of the projectile. The cartridge case, fitted with percussion primer and containing a triple-base propellant, is crimped to the projectile. A distinguishing characteristic of these rounds is the case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant ignite the tracer and force the projectile from the gun barrel. The tracer provides a luminous red trace. Upon impact, the windshield breaks up and the tungsten carbide shot penetrates the armored target.

**Tabulated Data:****Complete round:**

Type .....	AP-T
Weight .....	27.32 lb
Length .....	32.89 in.
Cannon used with .....	M32 or M48

**Projectile:**

Body material .....	Steel/tungsten carbide
Color .....	Black w/white markings

**Components:**

Cartridge case ----- M88 (brass);  
M88B1 (steel)  
Propelling charge ----- M30, 5.6 lb  
Primer ----- M58 percussion  
(400 gr black)

Tracer ----- M13

**Performance:**

Maximum range ----- 14,704 m  
(16,419 yd)  
Muzzle velocity ----- 954 mps (3200  
fps)

**Temperature limits:**

**Firing:**

Lower limit ----- -40°F  
Upper limit ----- +125°F

**Storage:**

Lower limit ----- -80°F (for period  
not more than 3  
days)  
Upper limit ----- +160°F (for  
period not more  
than 4 hr/day)

\*Packing ----- 1 round per  
fiber container;  
2 containers per  
wooden box

**\*Packing box:**

Weight ----- 88 lb  
Dimensions ----- 38-5/8 x 11-1/6  
x 7-5/32 in.  
cube ----- 1.8 cu ft

\* NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN's.

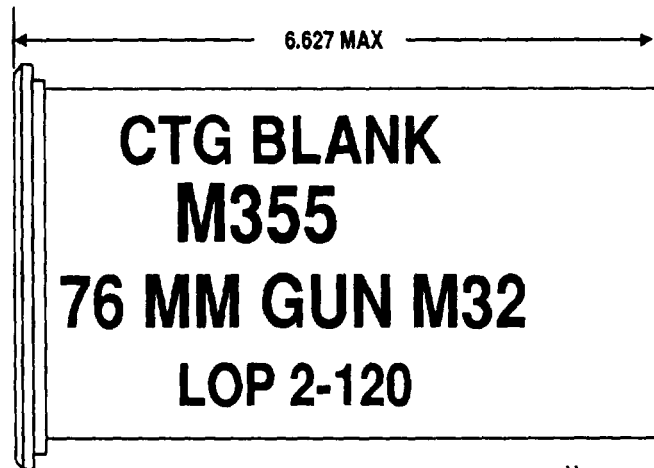
**Shipping and Storage Data:**

UNO serial number ----- 0328  
Quantity-distance class ----- (08) 1.2  
Storage compatibility group--- C  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH SOLID  
PROJECTILES  
DODAC ----- 1315-C120  
Drawing number ----- 8886612

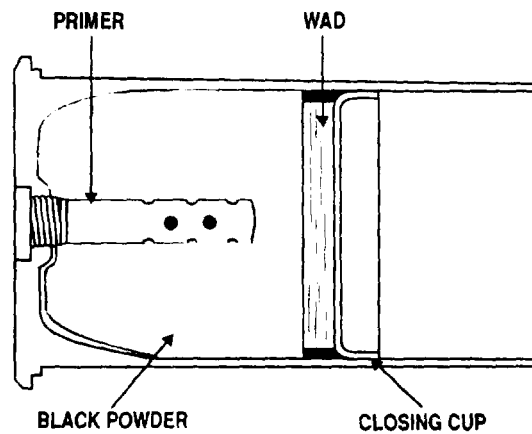
**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1300-251-20

**CARTRIDGE, 76 MILLIMETER: BLANK, M355A2**



U  
AR 199849



U  
AR 199848

**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge is used for salutes and simulated fire in 76mm guns.

**Description:**

The cartridge contains a charge of sodium nitrate black powder, loosely assembled in a primed brass or steel cartridge case. Slightly recessed in the mouth of the cartridge case is a plastic closing cup which retains the loose charge. Earlier models of this cartridge contain

a bagged charge of potassium nitrate black powder.

**Functioning:**

When the primer is initiated by the firing pin of the weapon, the black powder charge is ignited producing a flash, smoke, and loud report.

**Tabulated Data:**

Complete round:

Type .....	Blank
Weight .....	4.33 lb
Length .....	6.627 in.
Cannon used with .....	M32, M48

**Components**

Body material -----	Brass or steel
Color -----	Blue or black w/white marking
Filler and weight -----	BP, 1 lb
Cartridge case -----	M101 (brass); M101B1 (steel)
Primer -----	M70percussion
Temperature limits:	
Firing:	
Lower limit -----	-40°F
Upper limit -----	+125°F
Storage:	
Lower limit -----	-80°F (for period not more than 3 days)
Upper limit -----	+160°F (for period not more than 4 hr/day)
*Packing -----	1 round per fiber container; 8 containers per wooden box
*Packing box:	
Weight -----	58 lb

Dimensions -----	22-1/4 x 11-1/8 x 10 in.
Cube -----	1.43 cu ft

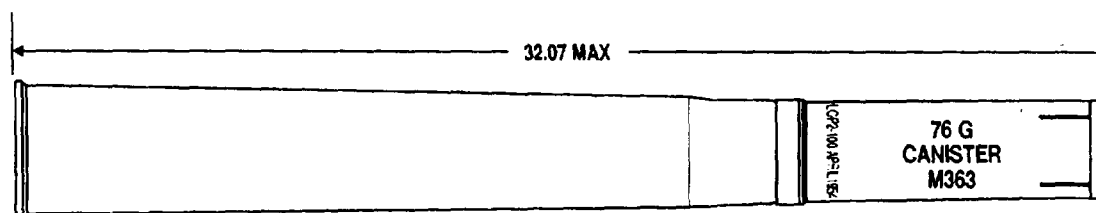
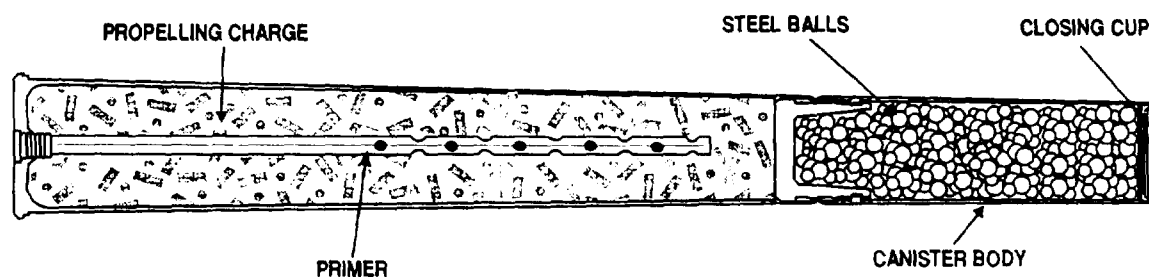
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0327
Quantity-distance class -----	1.3
Storage compatibility group---	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC -----	1315-C131
Drawing number -----	7549267

**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1300-251-20

**CARTRIDGE, 76 MILLIMETER: CANISTER, M363**U  
AR 199865U  
AR 199864**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed cartridge is intended for use in 76mm gun cannons against personnel at close range.

**Description:**

The canister has a heavy steel base and a lightweight body and is loaded with steel balls. The forward end is sealed with a closing cup. The canister body is distinguished by four equally spaced longitudinal slits in the lightweight body construction. The canister body is assembled to a brass or steel cartridge case, loaded with a single-base propellant, and fitted with a percussion primer. A distinguishing physical characteristic of these rounds is the case-over-band construction. The specially designed

rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant force the projectile out of the gun barrel. Immediately after leaving the gun barrel, the air pressure on the closing cup and the centrifugal force action on the body and balls cause the canister to break at the slits, dispersing the balls in a cone-shaped pattern along the line of flight.

**Tabulated Data:****Complete round:**

Type .....	Antipersonnel
Weight .....	27.18 lb
Length .....	32.07 in.
Cannon used with .....	M32 or M48

**Projectile:**

Body material ----- Steel  
 Color:  
 Old----- Black w/white  
                   marking  
 New ----- Olive drab  
                   w/white mark-  
                   ing  
 Filler and weight ----- Steel balls, 9 lb

**Components:**

Cartridge case ----- M88B1, M88  
 Propelling charge ----- M6, 5 lb  
 Primer ----- M62, percussion

**Performance:**

Maximum range ----- 155 m (192 yd)  
 Muzzle velocity ----- 716 mps (2400  
                                   fps)

**Temperature limits:**

Firing:  
 Lower limit ----- -40°F  
 Upper limit ----- +125°F  
 Storage:  
 Lower limit ----- -80°F (for period  
                                   not more than 3  
                                   days)  
 Upper limit ----- +160°F (for  
                                   period not more  
                                   than 4 hr/day)

\*Packing ----- 1 round per  
                                   fiber container;  
                                   2 containers per  
                                   wooden box

**\*Packing box:**

Weight ----- 88 lb  
 Dimensions ----- 37-5/16 x 11 x  
                                   7-5/32 in.  
 Cube ----- 1.7 cu ft

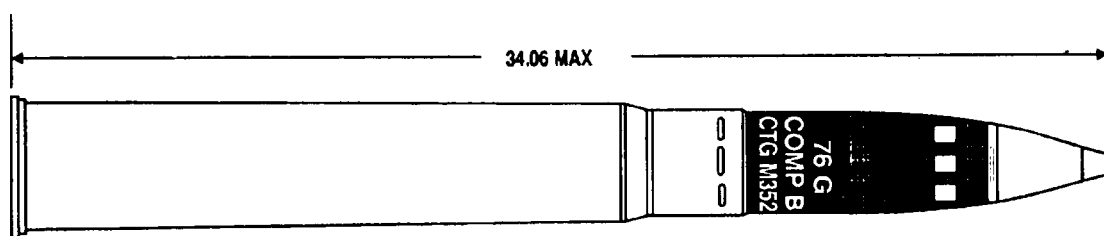
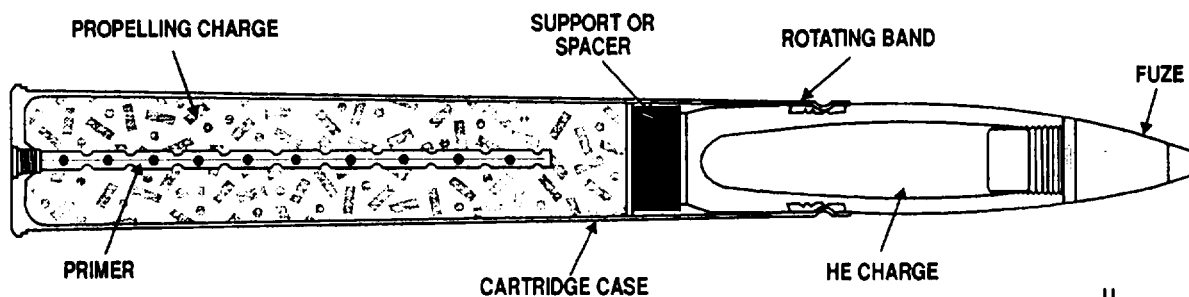
\*NOTE: See DOD Consolidated Ammunition  
 Catalog for complete packing data including  
 NSN's.

**Shipping and Storage Data:**

UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT designation ----- Ammunition  
                                   FOR CANNON  
                                   WITH SOLID  
                                   PROJECTILE  
 DODAC ----- 1315-C121  
 Drawing number ----- 9204458

**References:**

AMC-P 700-3-3  
 SB 700-20  
 TM 9-1300-251-20

**CARTRIDGE, 76 MILLIMETER: HE, M352**U  
AR 199861U  
AR 199860**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed cartridge is intended for fragmentation, blast, or mining effect and is used in 76mm guns against light materiel and personnel.

**Description:**

The projectile is a thin walled, forged steel casing with an explosive charge cavity, filled with Composition B, extending almost the full length of the body. The projectile is assembled with a nose fuze. A brass or steel cartridge case, containing a single-base propellant and a percussion primer, is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge

case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, a flash from the primer ignites the propellant. Gases created by the burning propellant force the projectile from the gun barrel. U on impact, fuze functioning detonates the explosive charge creating blast and fragmentation.

**Tabulated Data:****Complete round:**

Type ----- HE  
 Weight ----- 25.52 lb  
 Length ----- 34.06 in.  
 Cannon used with ----- M32 or M48

**Projectile:**

Body material ----- Steel  
 Color ----- Olive drab w/  
 yellow marking  
 Filler and weight ----- Comp B, 1.46 lb

**Components:**

Cartridge case ----- M88B1 (steel);  
M88 (brass)  
Propelling charge ----- M6, 3.64 lb  
Primer ----- M58 or M68

percuSSION  
Fuze ----- PD or MTSQ

**Performance:**

Maximum range ----- 14,338 m  
(16,010 yd)  
Muzzle velocity ----- 716 mps (2400  
fps)

**Temperature limits:**

**Firing:**

Lower limit ----- -40°F  
Upper limit ----- +125°F

**Storage:**

Lower limit ----- -80°F (for period  
not more than 3  
days)  
Upper limit ----- +160°F (for  
period not more  
than 4 hr/day)

\* Packing ----- 1 round per  
fiber container;  
2 containers per  
wooden box

**\*Packing box:**

Weight ----- 86 lb

Dimensions ----- 39.15/16 x  
10-15/16 x  
7-3132 in.  
Cube ----- 1.8 cu ft

\*NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN's.

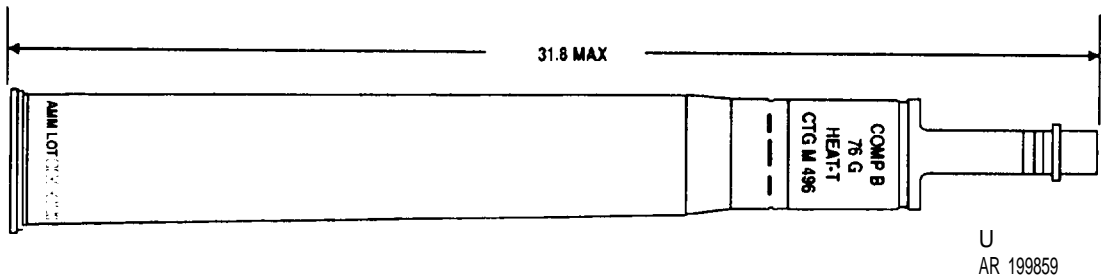
**Shipping and Storage Data:**

UNO serial number ----- 0321  
Quantity-distance class ----- (08) 1.2  
Storage compatibility group--- E  
DOT shipping class ----- A  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH  
EXPLOSIVE  
PROJECTILES  
DODAC ----- 1315-C122  
Drawing number ----- 75.1-293

**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1300-251-20

CARTRIDGE, 76 MILLIMETER: HEAT-T, M496



**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed ammunition cartridge is used in 76mm gun cannons against heavily armored targets.

**Description:**

The projectile is a hollow, steel shell tapered at the rear and fitted on the nose with a standoff spike containing a piezoelectric element. The shell is filled with high explosive fitted around an internal copper cone. The apex of the cone is to the rear, thus shaping the charge. The base of the projectile is closed by an adapter which also provides a seat for the fuze. A boom and fin assembly is assembled to the adapter (for stabilization in flight) and a tracer element is located in the fin assembly. A point-initiating, base-detonating (PIBD) fuze is located in the adapter. A brass cartridge case containing a single-base propellant and a percussion primer is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, flash from the primer ignites the propellant. The burning propellant ignites the tracer and generates gas to propel the projectile from the gun barrel. The boom and fin assembly provides stability in flight and the tracer provides a visible trace of the trajectory. Upon impact, the piezoelectric

element in the standoff spike initiates functioning of the PIBD fuze. The fuze detonates the explosive charge and causes the copper cone to collapse, creating a high velocity shock wave and a jet of metal particles which penetrate the target.

**Tabulated Data:**

Complete round:	
Type -----	HEAT-T
Weight -----	25.83 lb
Length -----	31.8 in.
Cannon used with -----	M32 or M48
Projectile:	
Body material -----	Steel
Color -----	Black w/white markings and yellow band
Filler and weight -----	Comp B, 1.1 lb
Components:	
Cartridge case -----	M171A1
Propelling charge -----	M6, 5.06 lb
Primer -----	M81, percussion
Tracer -----	M13
Fuze -----	PIBD-509A1
Performance:	
Maximum range -----	7488 m (8360 yd)
Muzzle velocity -----	1060 mps (3550 fps)
Temperature limits:	
Firing:	
Lower limit -----	-40°F
Upper limit -----	+125°F
Storage:	
Lower limit -----	-80°F (for period not more than 3 days)
Upper limit -----	+160°F (for period not more than 4 hr/day)

\*Packing ----- 1 round per  
fiber container;  
2 containers per  
wooden box

\*Packing box:  
Weight ----- 72.5 lb  
Dimensions ----- 37-1/16 x11x  
7-5/32 in  
Cube ----- 1.7 cu ft

\* NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN's.

**Shipping and Storage Data:**

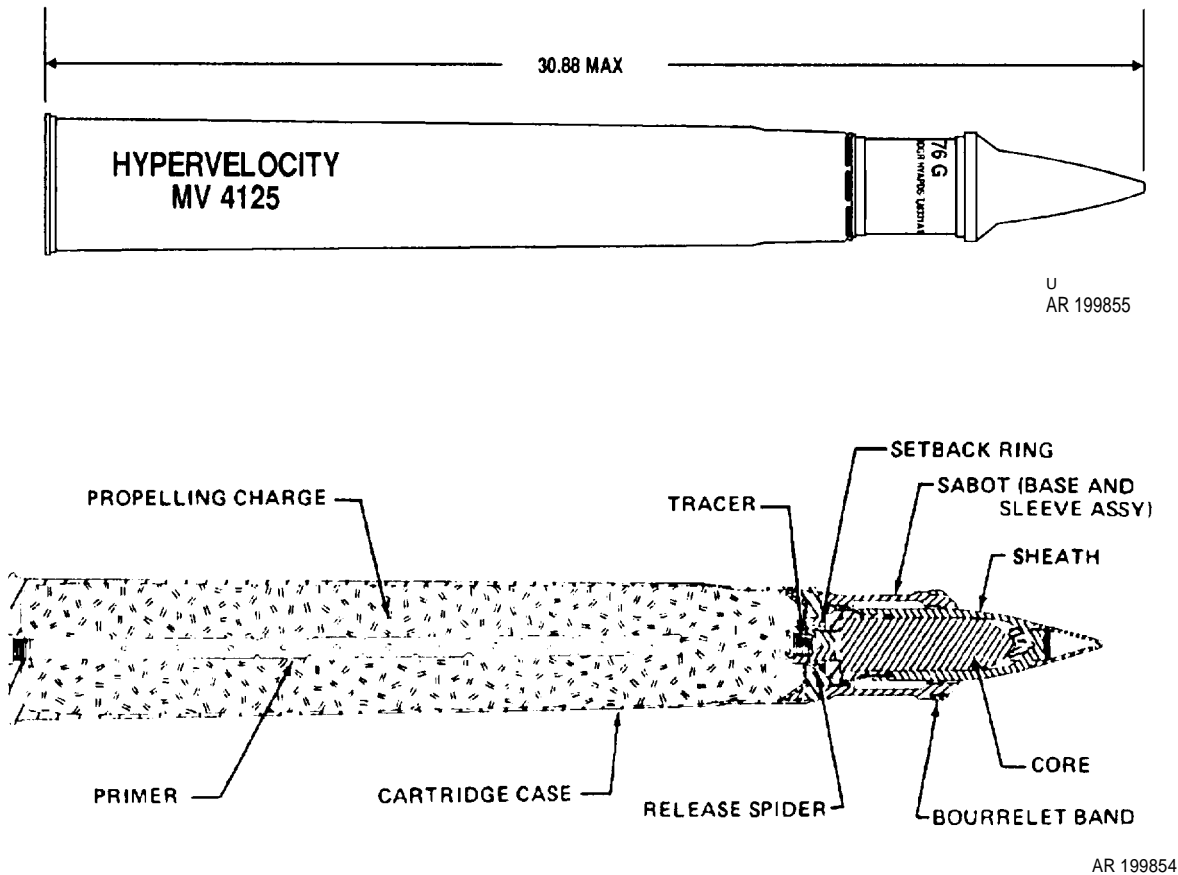
UNO serial number ----- 0321  
Quantity-distance class ----- (12) 1.2

Storage compatibility group --- E  
DOT shipping class ----- A  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH  
EXPLOSIVE  
PROJECTILES  
DODAC ----- 1315-C110  
Drawing number ----- 8848863

**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1300-251-20

CARTRIDGE, 76 MILLIMETER: HVAP-DS-T, M331A1 AND M331A2



**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed ammunition is intended for use in 76mm gun cannons against armor.

**Description:**

The projectile consists of a dense core of tungsten carbide steel, covered with a steel sheath, and a base and sleeve assembly called a sabot. The core is held in place inside the sabot by a sheet steel release spider. The projectile is inert, except for a tracer contained in the base. It is assembled to a steel cartridge case, which is loaded with a triple-base propellant and has a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the cartridge is fired, a setback ring moves rearward opening the release spider. Setback holds the sabot and core together until exit from the gun, at which time centrifugal force separates the sabot from the core. The tracer, ignited by the propellant, provides a visible trace during the first few seconds of flight. Upon impact, the projectile sheath crumples and the tungsten carbide core penetrates the target.

**Difference Between Models:**

See Tabulated Data for difference in cartridge cases and tracer assemblies.

**Tabulated Data:**

Complete round:

Type	-----	HVAP-DS-T
Weight	-----	20.7 lb
Length	-----	30.88 in.
Cannon used with	-----	M32, M48

**Projectile:**

Body material ----- Tungsten carbide steel and aluminum  
 Color ----- Black w/white marking

**Components:**

Cartridge case ----- M331A2; M88B1; M331A1; M88  
 Propelling charge ----- M17, 5.57 lb  
 Primer ----- M58 percussion  
 Tracer ----- M5 (M331A1); M5A3 (M331A2)

**Performance:**

Maximum range ----- 21,607 m (24,127 yd)  
 Muzzle velocity ----- 1231 mps (4125 fps)

**Temperature limits:**

Firing:  
 Lower limit ----- -40°F  
 Upper limit ----- +125°F

**Storage:**

Lower limit ----- -80°F (for period not more than 3 days)  
 Upper limit ----- +160°F (for period not more than 4 hr/day)

\*Packing ----- 1 round per fiber container; 2 containers per wooden box

**\*Packing box:**

Weight ----- 71 lb  
 Dimensions ----- 36-3/4 x 11-1/16 x 7-5/32 in.  
 Cube ----- 1.68 cu ft

\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

**Shipping and Storage Data:**

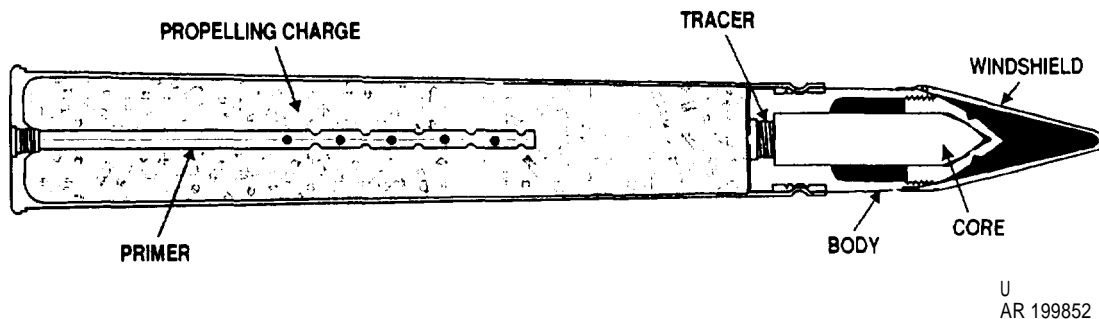
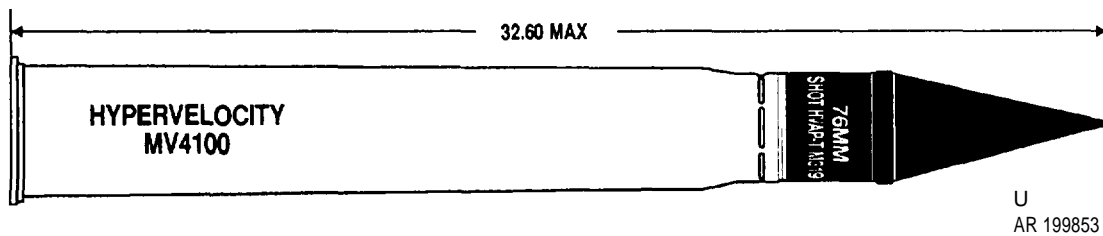
UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES  
 DODAC ----- 1315-C125  
 Drawing number ----- 75-1-308

**Limitations:**

The danger area from the discarded sabot extends downrange approximately 750 meters along the path of trajectory and spreads out to 45 meters on either side of the trajectory at that range.

**References:**

AMC-P 700-3-3  
 SB 700-20  
 TM 9-1300-251-20

**CARTRIDGE, 76 MILLIMETER: HVAP-T, M319****Type Classification:**

C & T AMCTC 6267 dtd 1968.

**Use:**

This fixed ammunition is a high velocity cartridge intended for use in 76mm gun cannons against armor.

**Description:**

The projectile consists of a core of tungsten carbide housed in an aluminum body fitted with an aluminum windshield, and it contains a tracer assembly in the base. The brass or steel cartridge case contains a single-base propellant and a percussion primer, and is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, the flash from the primer ignites the propellant. The burning propellant ignites the tracer and creates gases which propel the projectile from the gun barrel.

The tracer provides a luminous trace during the early stages of flight. Upon impact, the windshield breaks up and the tungsten carbide core penetrates the target by kinetic energy.

**Tabulated Data:**

Complete round:	
Type .....	HVAP-T
Weight .....	19.04 lb
Length .....	32.6 in
Canon used with .....	M32, M48
Projectile:	
Body material .....	Aluminum alloy
Core .....	Tungsten carbide
Color .....	Black w/white markings
Components:	
Cartridge case .....	M88B1, M88
Propelling charge .....	M6, 5.03 lb
Primer .....	M62, M58 percussion
Tracer .....	M5A1B1 or M5A1
Performance:	
Maximum range .....	9885 m (11,038 yd)
Muzzle velocity .....	1234 mps (4135 fps)

Temperature limits:

Firing:

Lower limit ----- -40°F  
Upper limit ----- +125°F

Storage:

Lower limit ----- -80°F (for period  
not more than 3  
days)  
Upper limit ----- +160°F (for  
period not more  
than 4 hr/day)

\* Packing ----- 1 round per  
fiber container;  
2 containers per  
wooden box

\*Packing box:

Weight ----- 66.75 lb  
Dimensions ----- 37-3/16 x 11-1/6  
x 7-5/32 in.  
Cube ----- 1.7 cu ft

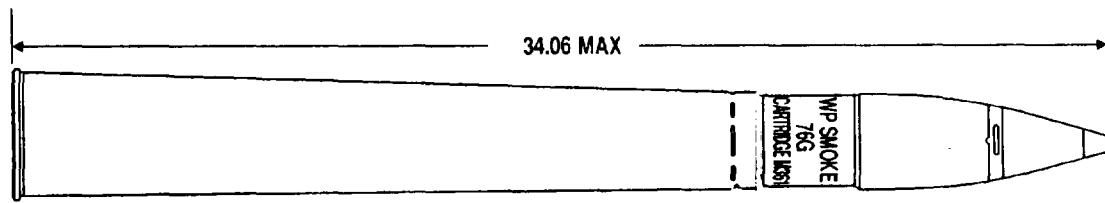
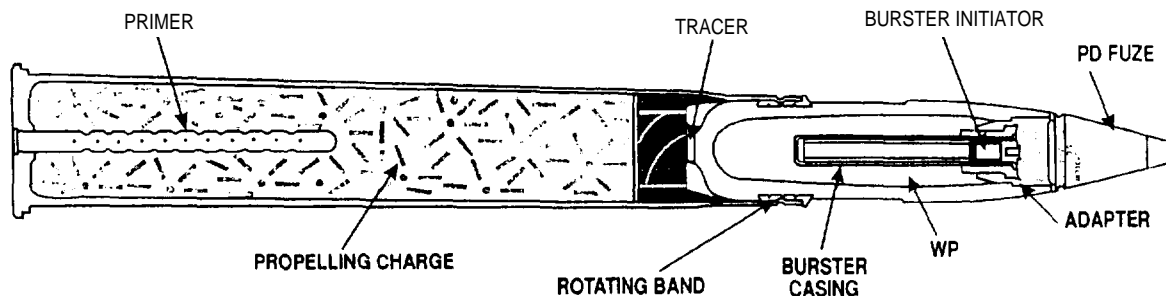
\*NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN'S.

**Shipping and Storage Data:**

UNO serial number ----- 0328  
Quantity-distance class ----- (08) 1.2  
Storage compatibility group--- C  
DOT shipping class ----- B  
DOT description ----- AMMUNITION  
FOR CANNON  
WITH SOLID  
PROJECTILES  
DODAC ----- 1315-C124  
Drawing number ----- 75-1-295

**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1300-251-20

**CARTRIDGE, 76 MILLIMETER: SMOKE, WP, M361A1 OR M361**U  
AR 199851U  
AR 199850**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed ammunition is used in 76mm guns for screening and spotting tire. The cartridge also has a slight incendiary effect.

**Description:**

The projectile body is a thin walled, forged steel casing. The point-detonating fuze projectile contains a white phosphorous (WP) filler and a combination one-piece aluminum burster casing and adapter. The burster casing houses a projectile burster and a burster initiator loaded with tetrytol. The brass or steel cartridge case assembled to the projectile contains a single-base propellant and a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has

a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, the primer flashes igniting the propellant. Gases created by the burning propellant force the projectile from the gun barrel. Upon impact, the burster initiator, activated by the point-detonating fuze, detonates the burster charge. This ruptures the projectile casing and expels the WP filler. Upon contact with the air, the WP ignites creating a dense white smoke.

**Difference Between Models:**

The M361 is similar to the M361A1 except that the burster is contained in a two-piece steel casing and the adapter is a separate component. Also, the M361A1 includes a tracer assembly in the base of the projectile. See Tabulated Data for cartridge case and fuze differences.

**Tabulated Data:****Complete round:**

Type ----- Smoke WP  
 Weight ----- 25.82 lb  
 Length ----- 34.06 in.  
 Cannon used with ----- M32, M48

**Projectile:**

Body material ----- Forged steel  
 Color:  
 Old ----- Gray w/yellow  
 band and yellow  
 marking  
 New ----- Light green  
 w/yellow band  
 and red mark-  
 ing

Filler and weight ----- WP, 1.38 lb  
 Bursting ----- M28, 1.2 oz  
 tetrytol  
 Bursting initiator ----- M2

**Component:**

Cartridge case ----- M361A1;  
 M88B1; M361:  
 M88  
 Propelling charge ----- M6, 3.64 lb  
 Primer ----- M68, M58 per-  
 cussion  
 Fuze ----- PD: M521  
 (M361A1);  
 M48A3 (M361)

**Performance:**

Maximum range ----- 14,594 m  
 (16,296 yd)  
 Muzzle velocity ----- 713 mps (2400  
 fps)

**Temperature limits:**

Firing:  
 Lower limit ----- -40°F  
 Upper limit ----- +125°F  
 Storage:  
 Lower limit ----- -80°F (for period  
 not more than 3  
 days)  
 Upper limit ----- +125°F

\*Packing ----- 1 round per  
 fiber container;  
 2 containers per  
 wooden box

**\*Packing box:**

Weight ----- 86 lb  
 Dimensions ----- 39-15/16 x  
 10-15/16 x  
 7-3/32 in.  
 Cube ----- 1.8 cu ft

\*NOTE: See DOD Consolidated Ammunition  
 Catalog for complete packing data including  
 NSN's.

**Shipping and Storage Data:**

UNO serial number ----- 0245  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group--- H  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH SMOKE  
 PROJECTILES  
 DODAC ----- 1315-C128  
 Drawing number ----- P85133

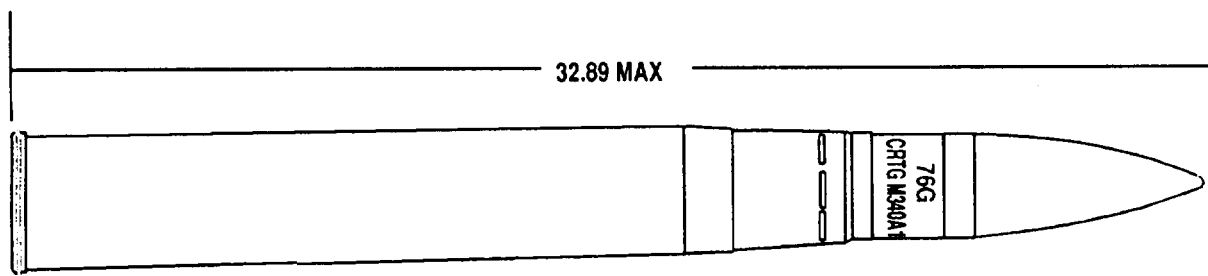
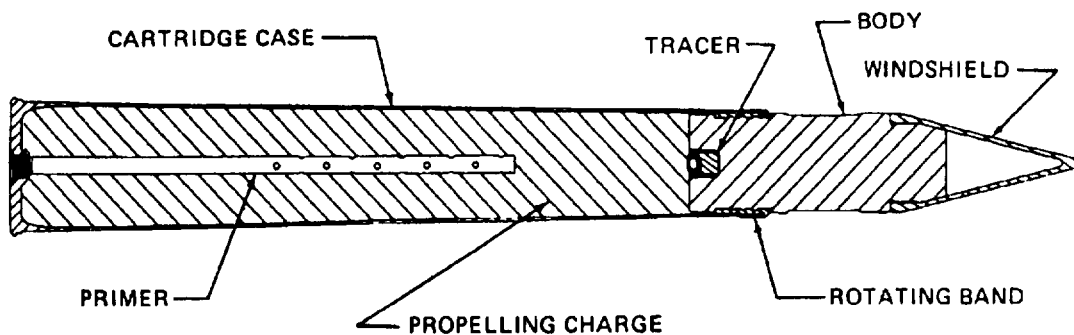
**Limitations:**

Since the bursting in this ammunition is  
 loaded with tetrytol, it is not to be stored or  
 fired at temperatures exceeding +125°F.

Store and transport rounds at tempera-  
 tures below 111.4°F (melting point of WP). If  
 impractical, store rounds on bases so that if WP  
 melts it will resolidify with void space in the  
 nose of the projectile, Erratic performance may  
 occur if voids exist inside the WP filler.

**References:**

AMC-P 700-3-3  
 SB 700-20  
 TM 9-1300-251-20

**CARTRIDGE, 76 MILLIMETER: TP-T, M340A1 AND M340**U  
AR 199857U  
AR 199856**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge is intended for target practice.

**Description:**

The projectile consists of a steel body with a gilding metal rotating band and an aluminum windshield. A tracer is threaded into the base of the projectile. The brass or steel cartridge case is loaded with a triple-base propellant and fitted with a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

**Functioning:**

When the weapon is fired, the primer flashes igniting the propellant and tracer. Gases created by the burning propellant force the projectile from the gun barrel. The tracer burns with a visible trace for approximately three seconds of projectile flight. Upon impact, there is little penetration of the target because the round lacks armor-piercing capability.

**Difference Between Models:**

See Tabulated Data for difference in cartridge cases and tracer assemblies.

**Tabulated Data:**

Complete round:	TP-T
Weight	27.32 lb
Length	32.89 in
Cannon used with	M32, M48

**Projectile:**

Body material ----- Steel

**Color:**

Old----- Blue or black  
w/white mark-  
ing

New ----- Blue w/white  
marking

### Components:

Cartridge case -----	M340A1: M88B1; M340: M88
Propelling charge -----	M30, 5.6 lb
Primer -----	M58, percussive
Tracer -----	M5A2B1 (M340); M13 (M340A1)

### Performance:

Maximum range ----- 14,704 m  
(16,419 yd)  
Muzzle velocity ----- 955 mps (3200  
fps)

Temperature limits:

## Firing:

Lower limit ----- -40°F

Upper limit ----- +125°F

### Storage:

Lower limit ----- -80°F (for period  
not more than 3  
days)

Upper limit ----- +160°F (for  
period not more  
than 4 hr/day)

\*Packing ----- 1 round per  
fiber container;  
2 containers per  
wooden box

\*Packing box:

Weight ----- 88 lb

Dimensions ----- 38-5/8 x 11-1/16  
x 7-5/32 in.

Cube ----- 1.8 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

### Shipping and Storage Data:

UNO serial number ----- 0328

Quantity-distance class ----- (08) 1.2

Storage compatibility group--- C

DOT shipping class ----- B

DOT designation ----- AMMUNITION  
FOR CANNON  
WITH SOLID  
PROJECTILES

DODAC ----- 1315-C127

Drawing number ----- 8857345

### References:

AMC-P 700-3-3

SB 700-20

TM 9-1300-251-20

November 22, 2011

U.S. Army Corps of Engineers, Tulsa District  
Attn: (b) (6), Technical Manager  
CESWT-CE-ER  
1645 South 101<sup>st</sup> East Avenue  
Tulsa, Oklahoma 74128-4609

Re: Draft Letter Report on Three Closure Options, Oro Grande Landfill  
(SWMU-25/FTBL-14), Fort Bliss, New Mexico, Contract No. W912BV-04-D-2008,  
Task Order No. 0007, Modification 3

Dear (b) (6):

### **Background**

This letter provides our deliverable to Task 3 of the above contract as modified, which reads as follows:

**Task 3 – Cost Estimates for Landfill Closure.** The Contractor shall prepare budgetary cost estimates for closure of the landfill by capping and by excavation, transportation, and disposal of the wastes within the landfill.

Modification 3 provides for updated costs and the development of probable costs for an additional closure option and the development of a closure post closure care plan. The Contractor will evaluate three potential closure options for the landfill. These potential closure options are:

- Removal of Wastes and Disposal at a Permitted MSW Landfill (updated costs)
- Installation of a Final Engineered Cover (updated costs)
- Installation of a Final Evapotranspiration (ET) Cover (new)

The evaluation will involve an implementability assessment and the development or update of an opinion of probable cost for each of the three closure options.

The Contractor will prepare a letter report to summarize the findings of the evaluation and present a recommendation that complies with the *Solid Waste Facility and Composting Facility Closure and Post Closure Requirements* (20 NMAC 9.6). The draft report will be delivered to the USACE for review and comment. One round of comments will be incorporated into the final document.

## Executive Summary

Malcolm Pirnie recommends the Waste Removal and Disposal Closure Option as being the best life cycle option for the US Army at Fort Bliss. The primary reasons are; a low cost to achieve plus the value of no post closure care for the Government after completion. Further Malcolm Pirnie believes that although there may be questions concerning the unit costs of individual items in the detailed cost estimated the overall differences in the costs between each closure options are a true representation of their relationships.

## General

The detailed cost estimates are attached as follows: Enclosure 1 Updated Engineering Cap Closure, Enclosure 2 Evapotranspiration Cap Closure, and Enclosure 3 Waste Removal and Disposal or the cost of removal of all waste and disposal into a permitted facility. The Waste Removal and Disposal (Dig & Haul) while not the cheapest is comparable to the Evapotranspiration Closure and is the Recommended Closure option. A summary of the three costs is contained in Table 1 below.

**Table 1**  
**Task 3 Closure Cost Comparisons Orogrande LF (SWMU 25/FTBL-14)**

	Engineered Cap	ET Cap	Dig and Haul
Engineering Total	\$101,475	\$92,250	\$41,800
Construction Total	\$198,880	\$149,559	\$394,559
Permit Requirement Total	\$90,200	\$73,700	\$36,300
Post Closure Care Cost	\$148,500	\$148,500	\$1,100
Total Closure Cost	\$539,055	\$464,009	\$473,759

The unit cost and number of estimated quantities are shown on the detail sheet in each enclosure.

## Cost Comparisons

1. Engineering:
  - a. The Engineering cost items considered are:
    - Topographic and Boundary Survey (aerial map with ground control)
    - Site Evaluation
    - Development of Final Construction Plans
    - Specifications
    - Engineer's Cost Estimate
    - Contract Administration, Bidding and Award
    - QA/QC during field testing
    - Project Management, Construction Observation and Testing.



- b. The Engineered closure cap is slightly higher in cost because the design of the cap compared to an evapotranspiration (ET) cap design is more complex. The lowest cost is due to the fairly simple plans and specifications needed to remove the waste and fill in the resulting excavation. The NPDES Construction Storm Water Permit however will cost the same for all three options.

2. Construction:

a. The Construction cost items considered are:

- Mobilization, Demobilization and Set up.
- Clear and Grub
- 6" erosion control 2-4 inch rip rap – Engineered cap only
- 12 inch drainage layer – Engineered cap only
- 18 " of compacted  $1 \times 10^{-6}$  clay layer – Engineered cap only
- Geocomposit Drainage net – Engineered cap only
- 60-mil HDPE textured geomembrane – Engineered cap only
- Sub-base Prep – ET only
- Select Fill from borrow pit in area – ET & Dig and Haul only
- Cover Removal – Dig & Haul only
- Waste Removal – Dig & Haul only
- Re-vegetation
- Fencing – Engineered and ET only
- Stormwater improvements – Engineered and ET only
- Perimeter Ditch (grading) – Engineered only
- Perimeter Ditch (ECB) – Engineered only
- Erosion Control Lined Swales – Engineered only
- Compaction testing
- Fill material Geotechnical Analysis –Engineered and ET only
- Lechate Collection system Completion –Engineered and ET only
- Gas Monitoring System Completion –Engineered and ET only

- b. The Construction cost for the total waste removal and disposal are almost twice as much as the other two options because the haul cost to remove the waste in dump trucks to the Otero County Landfill 30 miles (and a US Border Patrol check station) from the Range Camp Landfill. The ET cover is less expensive than the Engineered cap because it relies mostly on locally available material for the cap construction.
- c. The re-vegetation procedure priced is the one authorized by (b) (6) Chief Botanist for the DPW Environmental Division, Conservation Section. It consist of using native, local soils found near the project site and scarifying or cutting slight (+/- 6") furrow in the soil in the direction of gradient to retain rain water to promote the germination of native seeds found in abundant numbers in the soil.



- d. The Lechate Collection and Gas Monitoring System cost for the Engineering and ET caps are not priced because all previous investigations of this very tiny (1/3 of an acre) site have not indicated either Lechate or Methane Gas production.
3. Permit Requirements:
- a. The Permit Requirement cost considered are:
- Final cover design/method/procedure update
  - Estimation of largest area requiring cover
  - Calculation of maximum inventory
  - Schedule of activities
  - Final contour map and report
  - Preparation of written notice to NMED
  - Preparation of response to NMED comments
  - Submittal of documents/certification of verified closure
  - Preparation of/submittal of "affidavit to Public".
  - Note: it is assumed and not priced that all three options require a Fort Bliss dig permit.
- b. The decrease in cost for Permit Requirements from Engineering to ET to Dig & Haul are a simple reflection of the complexity of the closure permits and expected number of NMED review comments and fees.
4. Post Closure Care:
- a. The Post Closure Care cost considered are:
- NMED Post Closure Plan review fees
  - NMED Yearly Fees
  - Yearly cap maintenance by DPW Jobs Contractor
  - Yearly Inspection by DERP Manager
  - 5 Year AEC Reviews
- b. The Engineered and ET closure costs both are quite large and continue for a period of 30 years. The Dig and Haul post closure care cost are extremely minimal for after affidavits/tipping receipts and final contours are submitted to NMED, there are no further post closure costs associated with this option.
- c. The NMED Annual Fees while is estimated at \$250 yearly fee for SWMU on Schedule B and are estimated to continue for 30 years for the Engineering and ET closure options.
5. Ability to Implement:
- a. All three closure options are physically able to be implemented.
- b. The Engineer Cap Closure will be the most complicated in design and the longest to gain approval from NMED,



(b) (6) Technical Manager  
U.S. Army Corps of Engineers  
November 23, 2011  
Page 5 of 5

- c. The ET cover the least complicated as it is essentially just a large earth moving operation and has as a precedent two previous ET landfill closure caps.
  - d. The Dig and Haul closure options has as its most critical activity the gaining of approval of the Otero County authority for the disposal of the waste from FTBL-014. There is more than sufficient past investigation reports to demonstrate that the waste is neither hazardous nor contains unexploded munitions, which are the two items most civilian landfill operators worry about with military waste.
6. Schedule Comparison:
- a. Although not required to be estimated, the Engineered cap will most likely take the longest time both for approval and to get all the materials in place.
  - b. The ET cap will take the shortest amount of time both to achieve closure plan approval and construction. By letter (Enclosure 4) NMED recommended an ET cover. Further the needed soils with acceptable hydro conductivity are available near the site.
  - c. The Dig and Haul will take the longest time to execute and shortest time to design and approve as NMED likes a clean closure with no waste left in place. However the time to dig load and haul the ~ 3,000CY of waste to the Otero County landfill followed by digging and hauling soil to backfill the hole will stretch this closure out.

#### Recommendation

It is recommended that the Waste Removal and Disposal closure procedure be investigated further with a full Remedial Investigation/Feasibility Study as the preferred method for closure of SWMU 25/FTBL-014, Orogrande Range Camp Landfill.

If you have any questions or if you need additional information, please call me at (b) (6) or email at (b) (6)

Very truly yours,

MALCOLM PIRNIE, INC.

(b) (6)

Senior Project Manager

Cc: (b) (6) PE, Tulsa USACE  
(b) (6) Fort Bliss DPW Environmental Division  
(b) (6) PG, Pirnie Houston

05285027



Closure Cost Comparison  
Orogrand Range Camp MSW Landfill (SWMU 25/FTBL-014)  
November 23, 2011  
Updated Permitted Design

ITEM	UNITS	NO. OF UNITS	UNIT COST	TOTAL COST	Notes
<b>1.0 Engineering</b>					
1.1 Topographic and Boundary Survey (aerial map with ground control)	EA	1	\$3,000	\$3,000	
1.2 Site Evaluation	EA	1	\$6,250	\$6,250	
1.3 Development of Final Construction Plans	EA	1	\$30,000	\$30,000	
1.4 Specifications	EA	1	\$15,000	\$15,000	
1.5 Engineer's Cost Estimate	EA	1	\$6,000	\$6,000	
1.6 Contract Administration, Bidding, and Award	EA	1	\$8,500	\$8,500	
1.7 QA/QC during field testing	EA	1	\$2,500	\$2,500	
1.8 Project Management; Construction Observation and Testing	EA	1	\$15,000	\$15,000	
1.9 NPDES Construction Storm Water Permit	EA	1	\$6,000	\$6,000	
Subtotal				\$92,250	
10% Contingency				\$9,225	
Total				\$101,475	
<b>2.0 Construction</b>					
2.1 Mob/Demob/Set up	EA	1	\$ 5,000.00	\$5,000	Gas at \$3.45/gal
2.2 Engineered Cap and Cover					
2.2.1 6" erosion control 2-4 inch rip rap	CY	278	\$60	\$16,667	
2.2.2 12-inch drainage layer	CY	556	\$35.00	\$19,444	
2.2.3 18" of compacted 10-6 clay layer	CY	833	\$50.00	\$41,667	
2.2.4 Geocomposite Drainage net	SY	1,667	\$6.00	\$10,000	
2.2.5 60-mil HDPE textured geomembrane	SF	15,000	\$1.50	\$22,500	
2.2.6 Fencing	LF	1,000	\$35.00	\$35,000	Chain Link with signage
2.3 Site Grading and Drainage					
2.3.1 Perimeter Ditch (grading )	CY	122	\$10	\$1,222	
2.3.2 Perimeter Ditch (ECB)	SF	3,000	\$2.00	\$6,000	
2.3.3 Erosion Control Lined Swales	EA	2	\$1,500	\$3,000	
2.4 Leachate Collection System Completion	Lot	0	\$0	\$0	
2.5 Gas Monitoring System Completion	Lot	0	\$0	\$0	
2.6 Revegetation	SF	15000	\$0.14	\$2,100	Furrow soil slightly in direction of gradient to catch native seeds in soil. Fort Bliss Enviro standard plan.
2.9 Compaction Testing	EA	18	\$250.00	\$4,500	

2.10 Fill Material Geotechnical Analysis	EA	4	\$500.00	\$2,000	
Subtotal				\$169,100	
10% Contingency				\$16,910	
Total				\$186,010	

ITEM	UNITS	NO. OF UNITS	UNIT COST	TOTAL COST	Notes
4.0 Permit Requirements					
4.2 Update Final Closure Plan					
4.2.1 Final cover design/method/procedure	EA	1	\$15,000	\$15,000	
4.2.2 Est. largest area requiring cover	EA	1	\$4,000	\$4,000	
4.2.3 Calculate max. inventory	EA	1	\$4,000	\$4,000	
4.2.4 Schedule of activities	EA	1	\$6,000	\$6,000	
4.2.5 Final contour map and report	EA	1	\$15,000	\$15,000	
4.3 Implementation of Closure Plan					
4.3.1 Prepare written notification to NMED	EA	1	\$4,000	\$4,000	
4.3.2 Prepare extensions as necessary	EA	2	\$4,000	\$8,000	
4.3.3 Submit doc/cert of verified closure	EA	1	\$6,000	\$6,000	
4.3.4 Prepare/submit "affidavit to public"	EA	1	\$20,000	\$20,000	
Subtotal				\$82,000	
10% Contingency				\$8,200	
Total				\$90,200	
Post Closure Care Cost					
NMED Closure Plan Review Fee	Lot	1	\$7,500.00	\$7,500.00	Moves from Schedule A to B
NMED Yearly Fees <sup>7</sup>	Ea	30	\$250.00	\$7,500.00	
Yearly cap maintenance by DPW <sup>8</sup>	Ea	30	\$2,500.00	\$75,000.00	Twice a rainy season repairing drainage swales
Yearly Inspections	Ea	30	\$1,000.00	\$30,000.00	DERP Manager site visit & report
Five Year Reviews	Ea	6	\$2,500.00	\$15,000.00	DERP Manager completes AEC review
				\$135,000.00	

		Engineering Total	\$101,475
		Construction Total	\$186,010
		Permit Requirement Total	\$90,200
		Post Closure Care Cost	\$135,000.00
Total Engineered Closure Cap FTBL-014			\$512,685

Closure Cost Comparison  
Orogrand Range Camp MSW Landfill (SWMU 25/FTBL-014)  
November 23, 2011  
OPTION 2-ET Cover with Local Area Soils

ITEM	UNITS	No. of UNITS	UNIT COST	TOTAL COST	NOTES
<b>1.0 Engineering</b>					
1.1 Topographic and Boundary Survey (aerial map with ground control)	EA	1	\$3,000	\$3,000.00	
1.2 Site Evaluation	EA	1	\$6,250	\$6,250.00	
1.3 Development of Final Construction Plans	EA	1	\$30,000	\$30,000.00	
1.4 Specifications	EA	1	\$15,000	\$15,000.00	
1.5 Engineer's Cost Estimate	EA	1	\$6,000	\$6,000.00	
1.6 Contract Administration, Bidding, and Award	EA	1	\$8,500	\$8,500.00	
1.7 QA/QC during field testing	EA	1	\$2,500	\$2,500.00	
1.8 Project Management: Construction Observation and Testing	EA	1	\$15,000	\$15,000.00	
1.9 NPDES Construction Storm Water Permit	EA	1	\$6,000	\$6,000.00	
SUBTOTAL				\$92,250.00	
10% Contingency				\$9,225.00	
Total				\$101,475.00	
<b>2.0 Construction</b>					
2.1 Mob/Demob/Set-up	Units	Estimated Units	Est. Unit Price	Extension	
2.2 Clear & Grub	LS	1	\$5,000	\$5,000.00	Gas assumed at \$3.45/gal
2.3 Sub-base Prep	SF	15,000	\$0.78	\$11,666.67	
	SF	14,000	\$0.89	\$12,444.44	
2.4 Select Fill from borrow pit in area	CY	2,593	\$20.00	\$51,851.85	4-foot thick layer of select fill will be earthen material having a saturated hydraulic conductivity less than or equal to 1x10 <sup>-5</sup> cm/sec
2.6 Revegetation	SF	14,000	\$0.25	\$3,500.00	Furrow soil slightly in direction of gradient to catch native seeds in soil. Fort Bliss Enviro standard plan.
2.7 Fencing	LF	1,000	\$35.00	\$35,000.00	Chain Link w/signage
		1	\$10,000.00	\$10,000.00	Stormwater improvements consist of approximately 450 linear feet of a 6-foot wide trench approximately 2 feet deep. Approximately 350-feet of the trench will be lined with No. 6-minus rock rip-rap (Approximately 45 cubic yards).
2.8 Stormwater Improvements	LS				
2.9 Compaction Testing	EA	18	\$250.00	\$4,500.00	
2.10 Fill Material Geotechnical Analysis	EA	4	\$500.00	\$2,000.00	
Total Construction				\$135,963	
10% Contingency				\$13,596	
Total				\$149,559	



Closure Cost Comparison  
Orogrand Range Camp MSW Landfill (SWMU 25/FTBL-014)  
November 23, 2011  
OPTION 3 - DIG AND HAUL

ITEM	UNITS	No. of UNITS	UNIT COST	TOTAL COST	NOTES
1.0 ENGINEERING					
1.1 Topographic and Boundary Survey (aerial map with ground control)	EA	1	\$3,000	\$3,000.00	
1.2 Site Evaluation	EA	0	\$6,250	\$0.00	Not needed for total waste removal
1.3 Development of Final Construction Plans	EA	1	\$5,000	\$5,000.00	Minimal for dig and haul
1.4 Specifications	EA	1	\$2,500	\$2,500.00	Minimal for dig and haul
1.5 Engineer's Cost Estimate	EA	1	\$1,500	\$1,500.00	
1.6 Contract Administration, Bidding, and Award	EA	1	\$8,500	\$8,500.00	
1.7 QA/QC during field testing	EA	1	\$1,500	\$1,500.00	
1.8 Project Management; Construction Observation and Testing	EA	1	\$10,000	\$10,000.00	Less for smaller contract
1.9 NPDES Construction Storm Water Permit	EA	1	\$6,000	\$6,000.00	
SUBTOTAL				\$38,000.00	
10% Contingency				\$3,800.00	
Total				\$41,800.00	
2.0 Construction					
2.1 Mob/Demob/Set-up	EA	1	\$5,000	\$5,000	Gas at \$3.45/gal
2.2 Clear & Grub	SF	15,000	\$0.78	\$11,700	
2.3 Cover Removal	CY	2,723	\$35.00	\$95,288	Stored on site for backfill
2.4 Waste Removal	CY	2,594	\$25.00	\$64,844	Into covered dump trucks
2.5 Fill Material (Borrow soil)	CY	2,594	\$20.00	\$51,875	Nearby Orogrande RC borrow pits
2.6 Transport to Otero Landfill <sup>1</sup>	CY	2,594	\$15.00	\$38,906	
2.7 Disposal <sup>2</sup>	CY	2,594	\$32.03	\$83,077	Tipping fee \$22/ton 1 CY trash & soil ~ est at 1.2 tons/cy
2.8 Re-Vegetation <sup>3</sup>	SF	14,000.00	\$0.25	\$3,500	Furrow soil slightly in direction of gradient to catch native seeds in soil. Fort Bliss Enviro standard plan.
2.9 Fencing	LF	0	\$35.00	\$0	Chain Link w/signage
2.10 Compaction Testing	EA	18	\$250.00	\$4,500	
2.11 Fill Material Geotechnical Analysis	EA	0	\$500.00	\$0	
Total Construction				\$358,690	
10% Contingency				\$35,869	
Total				\$394,559	

ITEM	UNITS	No. of UNITS	UNIT COST	TOTAL COST	NOTES
4.0 Permit Requirements					
4.2 Update Final Closure Plan					
4.2.1 Final cover design/method/procedure	Lot	0	\$15,000	\$0	Not required for total waste removal
4.2.2 Est. largest area requiring cover	Lot	0	\$4,000	\$0	Not required for total waste removal
4.2.3 Calculate max. inventory	Lot	0	\$4,000	\$0	Not required for total waste removal
4.2.4 Schedule of activities	Lot	0	\$6,000	\$0	Not required for total waste removal
4.2.5 Final contour map and report	Lot	1	\$10,000	\$10,000	Needed for closure permit
4.3 Implementation of Closure Plan	Lot				
4.3.1 Prepare written notification to NMED	Lot	1	\$4,000	\$4,000	
4.3.2 Prepare extensions as necessary	Lot	2	\$4,000	\$8,000	
4.3.3 Submit doc/cert of verified closure	Lot	1	\$6,000	\$6,000	
4.3.4 Prepare/submit "affidavit to public"	Lot	1	\$5,000	\$5,000	Less required for total waste removal
Total Permitting				\$33,000	
10% Contingency				\$3,300	
Permitting Total				\$36,300	
5.0 Post Closure Care Cost					
5.1 NMED Closure Plan Review Fee	Lot	1	\$1,000.00	\$1,000.00	Estimate 2 submittals
5.2 NMED Yearly Fees	Ea	30	\$0.00	\$0.00	Not required
5.3 Yearly cap maintenance by DPW	Ea	30	\$0.00	\$0.00	Not required
5.4 Yearly Inspections	Ea	30	\$0.00	\$0.00	Not required
5.5 Five Year Reviews	Ea	6	\$0.00	\$0.00	Not required
10% Contingency				\$1,000.00	
Total				\$1,100.00	
				\$3,800	
			Engineering Total	\$394,559	
			Construction Total	\$36,300	
			Permit Requirement Total	\$1,100	
Total Estimated Cost Total Waste Removal and Disposal FTBL 14				\$435,759	



SUSANA MARTINEZ  
Governor

JOHN A. SANCHEZ  
Lieutenant Governor

NEW MEXICO  
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*Environmental Protection Division*  
*Solid Waste Bureau*

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DAVE MARTIN  
Secretary  
BUTCH TONGATE  
Acting Deputy  
Secretary

August 29, 2011

(b) (6) PMP  
Senior Project Manager  
Malcolm Pirnie, Inc  
211 N Florence Street, Suite 202  
El Paso, TX 79901

Re: Closure for the Oro Grande Landfill – SWMU-25/FTBL-14

(b) (6)

The Solid Waste Bureau is pleased to assist you in the closure of the Oro Grande Landfill (SWMU-25). It should be noted that the New Mexico Environment Department does not regulate this landfill and is only providing assistance via recommended closure requirements.

It appears from the information provided that two studies have been conducted at this site. The first one was to determine if SWMU-25 was releasing any contamination into the environment by testing for gas. The second study was to evaluate the cover and borrow area.

Information and plans recommended for closure are as follows:

**A) SITE DESCRIPTION:**

- 1) A report describing the general and local geology and hydrogeology of the landfill site area.
- 2) Groundwater information indicating depth(s) and, if possible, water quality.
- 3) A landfill description, including:
  - a) How long the landfill was in operation; date the landfill opened; date the landfill closed
  - b) The types of waste accepted at the landfill (i.e. - household, commercial, construction and demolition waste, etc.)
  - c) The volume of waste on-site at the time of closure
  - d) The size of the actual fill area (indicate dimensions and show on a topographic map)
  - e) Indicate existing structures (buildings, residences, sheds, etc), existing drainages, and water wells in the area (show on topographic map).
  - f) The size of the landfill property (indicate acreage and show on topographic map)

**B) COVER PLAN:**

- 1) Description of the cover material and source.
- 2) Indicate the source (borrow area) of the cover material.
- 3) A construction quality assurance / construction quality control (CQA/CQC) plan for placement of the final cover.
- 4) What equipment will be utilized to apply the cover to the landfill and how it will be compacted to obtain the appropriate Proctor Density.
- 5) Thickness of the cover material.\*
- 6) Indicate final contours\*\* and grade (show on site topographic map)

Note: \*Part 20.9.6.9.A(1)(a)(b) and (c) NMAC of the Rules. Under the 2007 Solid Waste Rules, an infiltration layer of a minimum of 18 inches of earthen material having a saturated hydraulic conductivity less than or equal to the saturated hydraulic conductivity of any bottom liner system or natural subsoil present, or a saturated hydraulic conductivity no greater than  $1 \times 10^{-5}$  cm/sec whichever is less for landfills that receive greater than 7300 tons (~ 20 tons/day average) or  $1 \times 10^{-5}$  cm/sec for landfills that receive less than 7300 tons. An erosion layer consisting of at least 6 inches of earthen material that is capable of sustaining native plant growth. \* 20.9.6.10 NMAC: For construction and demolition landfills a final cover of not less than 24 inches of approved material consisting of 18 inches of approved material and a layer for minimizing erosion of not less than 6 inches that is capable of sustaining native plant growth. Alternative covers may be submitted but they must meet the criteria in the Rules and receive approval from the Department.

\*\*Part 20.9.6.9.A(1)(e) NMAC of the Rules. The final contours must exhibit gradients in which the side slopes shall not exceed 25% (or 33% under 20.9.6.9.A(2)(d) ) grade and the top portion of the landfill shall have a gradient of 2% to 5% (depending on when the facility was permitted or expanded) in order to prevent ponding of water and erosion of the cover material.

**C) FINAL USE:**

- 1) Define the vegetation plan, including:
  - a. the spreading method
  - b. species of vegetation to be planted
- 2) Final usage plan for the landfill site area.
- 3) Describe the methane monitoring plan. Methane monitoring is required in any buildings adjacent to the fill areas and along property boundaries.
- 4) Plan to prevent unauthorized access
- 5) Plan to remove unused structures
- 6) A schedule for completion of closure activities.
- 7) Upon completion of closure, file a detailed use description of the site, with a plat, with the county land recording authority. Provide a copy of the filed recording to the Department.

**D) POST-CLOSURE CARE PLAN:**

- 1) Describe the monitoring and repair plan to protect cover integrity from settlement, ponding, water and wind erosion, drainage, and vegetation maintenance over the 30 year post-closure period.
- 2) Description of the methane monitoring plan during post-closure.
- 3) Description of the groundwater monitoring system\* plan during post-closure.

Note: \*Groundwater monitoring system plans in accordance with Part 20.9.9 of the Rules are required for landfills closed after May 13, 1989, unless the landfill qualifies for an exemption under Part 20.9.2.14 or 20.9.9.8 NMAC. However, those landfills with exemptions (with Department approval) must address groundwater monitoring.

E) MAPS AND DRAWINGS:

Maps that are required for closure/post-closure care plans are as follows:

- 1) U.S.G.S. 7.5 Minute Topographic Map: indicating the *landfill property boundary, cells (fill areas), wells, and structures* within and surrounding the landfill site
- 2) Plan Drawings (including Final Contour Grade Map) indicating:
  - (a) the *final contours and vegetation* in relationship to the surrounding land and any run-on and run-off control structures;
  - (b) *well location(s), depth to groundwater and flow direction (local and/or regional) and gradient;*
  - (c) the locations at which methane monitoring values are established.
- 3) Geological Map and Cross-sections: indicating the *surface geology* of the landfill site and surrounding site including *cross-sections* illustrating subsurface geologic structures (e.g. - faults, dipping strata, etc.).

F) FINANCIAL ASSURANCE:

Municipal landfills and landfills granted a waiver under 20.9.2.14 NMAC operating on or after April 9, 1997 or solid waste facilities permitted after January 30, 1992 are required to have Financial Assurance under 20.9.10 NMAC. Contact the SWB Financial Assurance Officer at 505-827-2860 to ensure that Financial Assurance mechanism(s) (in accordance with the Rules) has been executed. Financial Assurance costs should include but not be limited to hiring a third party contractor to close the largest area of the facility ever requiring closure and should include proof of financial assurance.

If you have any questions please feel free to contact me at (b) (6) or by email at

Sincerely,

Permit Section  
Solid Waste Bureau

emcc: (b) (6), Bureau Chief, Solid Waste  
(b) (6), Malcolm Pirnie



SUSANA MARTINEZ  
Governor  
JOHN A. SANCHEZ  
Lieutenant Governor

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ENVIRONMENT DEPARTMENT

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RYAN FLYNN  
Cabinet Secretary  
BUTCH TONGATE  
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

June 26, 2014

(b) (6) R.A.  
Chief, Environmental Division  
Directorate of Public Works  
Department of the Army  
Headquarters, U.S. Army Garrison Command  
1741 Marshall Road  
Fort Bliss, TX 79916-3803

**RE: RESPONSE TO LETTER  
APPROVAL FINAL REPORT FOR THE COVER AND BORROW AREA  
INVESTIGATION OF THE ORO GRANDE LANDFILL (SWMU-  
25/FTBL-014)  
FORT BLISS, NEW MEXICO  
EPA ID #NM4213720101  
HWB-FB-13-002**

Dear (b) (6):

The New Mexico Environment Department (NMED) has reviewed the Department of Army's (Permittee) letter in response to the conference call held on March 21, 2014, about NMED's document *Approval-Final Report for the Cover and Borrow Area Investigation of the Oro Grande Landfill (SWMU-25/FTBL-014)*, Fort Bliss, New Mexico (status report), dated January 2, 2014.

NMED agrees that the landfill does not need to be closed under 40 CFR 264, and that the reference made in the previous report was incorrect. In the Fort Bliss 1995 Permit this unit is listed as a Solid Waste Management Unit in Table 2, List of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) Requiring Corrective

(b) (6)

June 26, 2014

Page 2

Action (modified December 15, 2004). As stated by the Permittees in a cover letter, *Final Letter Report for the Cover and Borrow Area Investigation of the Oro Grande Landfill (SWMU-25/FTBL-014* dated September 6, 2013, 'the best option for Fort Bliss would be complete removal of waste from SWMU-25/FTBL-014, and the disposal of the waste of soil removed waste a permitted municipal landfill". The Permittee must submit a work plan that would provide information on the dimensions of the landfill, waste characterization methods, waste collection disposal and of confirmatory samples from the walls and base of the excavated area.

The Permittee has indicated that the work plan's deadline of October 10, 2014 may need to be revised to accommodate the Permittee's funding schedule. The Permittee must submit a formal extension request to the department prior to October 10, 2014, justifying the need for and proposing a new extension deadline for the work plan to be submitted to NMED.

If you have any questions regarding this letter, please contact (b) (6)

Sincerely,

(b) (6)

Chief  
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB  
N. Dhawan, NMED HWB  
S. Briley, NMED HWB  
R. Baca, DoA, Ft. Bliss  
S. Waggoner, Ft. Bliss

File: Fort Bliss (SWMU 25), Oro Grande Landfill  
FB-13-002

# **Preliminary Assessment Report**

## **Preliminary Assessment and Fencing for Illegal Dump Site at Far East Bliss Fort Bliss, El Paso, El Paso County, Texas**

**USACE CONTRACT NO. W912BV-11-D-0003  
TASK ORDER NO. 0006**

*Submitted to:*

**U.S. Army Corps of Engineers, Tulsa District**



*Prepared by:*



**Oneida Total Integrated Enterprises, LLC  
1030 Central Parkway South  
San Antonio, TX 78232**

**November 2014**



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## ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESWT	Corps of Engineers Southwestern Division – Tulsa District
FTBL	Fort Bliss
HASP	Health and Safety Plan
mg/kg	milligram per kilogram (ppm)
MSL	mean sea level
OTIE	Oneida Total Integrated Enterprises
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
PCL	Protective Concentration Levels
PMP	Project Management Plan
QA	quality assurance
QASP	quality assurance surveillance plan
QC	quality control
QCP	Quality Control Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SOW	scope of work
SSHO	site safety and health officer
TCEQ	Texas Commission on Environmental Quality
TM	Technical Manager
TO	task order
TPH	Total Petroleum Hydrocarbons
TRRP	Texas Risk Reduction Program
µg/kg	microgram per kilogram (ppb)
USACE	U.S. Army Corps of Engineers
U.S. EPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WMP	Waste Management Plan
WP	Work Plan

## 1.0 INTRODUCTION

Oneida Total Integrated Enterprises, Inc. (OTIE), a contractor of the U.S. Army Corps of Engineers (USACE), Tulsa District (CESWT) and procured under Environmental Remediation Services Contract Number W912BV-11-D-0003, Task Order (TO) 0006, has been authorized to conduct environmental remediation services at a suspected Illegal Dump Site at Far East Fort Bliss (Site), Fort Bliss, Texas.

This Preliminary Assessment (PA) Report is prepared by OTIE and documents PA activities and includes the analytical data, photos, survey, and site assessment activities. This PA is submitted to the CESWT in accordance with Section 5 of the Government's Revised Scope of Work (SOW) dated 19 September 2013. Work was performed in accordance with the USACE's SOW, the final approved Work Plan (WP), Sampling and Analysis Plan (SAP), Accident Prevention Plan/Health and Safety Plan (APP/HASP), Waste Management Plan (WMP), and Quality Control Plan (QCP). proposed.

OTIE performed the PA using Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) guidelines, and followed the reporting outline in general accordance with the latest edition of the United States Environmental Protection Agency (U.S. EPA) *Guidance for Performing Preliminary Assessments under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (1991)*.

### 1.1 Purpose and Objectives

The overall objective and purpose of the project is to perform Preliminary Assessment (PA) activities and reporting and fence installation; specifically:

- Preparation of a Project Management Plan and Field Documents and plans.
- Illegal Dump Site Preliminary Assessment and Fencing:
  - collection and chemical analysis of 12 soil samples.
  - Installation of a three-strand wire fence and signage around an approximate perimeter of 1,320 feet with one double gate.
  - Survey of fence boundary and sample locations
  - PA Report.
- Consulting Services (anticipated, but unidentified at time of Task Order TO award).
- Option 1 – Closed Sanitary/Rubble Landfill No. 2 (FTBL-002) installation of a three-strand fence around a perimeter of approximately 9,430 feet with two double gates. Survey of fence boundary.

### 1.2 Report Organization

This report follows the abbreviated reporting outline of the EPA Guidance and is divided into the following sections:

Section 1.0, provides the purpose and objectives and organization of the report.

Section 2.0 provides background information, site description, and an overview of the preliminary assessment activities.

Section 3.0 provides the pathway and environmental hazard assessment for groundwater, surface water and soil exposure.

Section 4.0 provides the summary conclusions.

Section 5.0 provides the referenced documents used for the production of the report.



## **2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS**

### **2.1 Site Location and Description**

Fort Bliss Military Reservation is an active military training facility located in the extreme western part of the State of Texas at El Paso and the south-central area of the State of New Mexico (Figure 1). The reservation occupies approximately 1.2 million acres covering two states and three counties (Dona Ana, NM, Otero, NM and El Paso, TX). The main cantonment area is situated adjacent to the City of El Paso, TX. The reservation falls under the command of the US Army Training and Doctrine Command.

The Far East Bliss Illegal Dump Site (the Site) is located in far eastern Fort Bliss (Figure 2), approximately 15 miles northeast of the main cantonment. The several low piles of weathered debris are suspected to contain medical waste as well as cans, bottles, and vehicle tires and parts. Source of the waste and party responsible for dumping are unknown. The suspected illegal dumping is speculated to have occurred four or more decades ago based on DPW personnel observations, publicly available aerial image examination, and that the type of glass vials and syringes found at the site were in common use in the 1970s and have since been discontinued, being replaced by disposable syringes. Through visual observation the debris appeared to have been dumped on the ground surface with no excavating or burial. Over time the waste piles have become partially covered and mixed with wind-blown deposits, with scattered desert scrub vegetation growing through the piles. The area within the fenced boundary of the Site covers approximately 2.24 acres (Figure 3). The Site is undeveloped and contains no physical plant, wells, or structures, and no on-site workers. No known recorded contaminant releases, environmental violations, or citizen complaints associated with the Site were identified.

#### **2.1.1 Operational History**

Fort Bliss encompasses approximately 1.2 million acres in Texas and New Mexico consisting of ranges, training and maneuver areas, and an Army Airfield with the third longest runway in the nation. These resources at Fort Bliss serve for training, mobilizing, and deploying combat forces. Fort Bliss is comprised of a complex of facilities, training areas, and ranges to support training and test activities of the Army and other organizations, including the Main Cantonment Area, and the Fort Bliss Training Complex: McGregor Range, Doña Ana Range-North Training Areas, and South Training Areas. The Site is located northeast of the main cantonment in the southeastern portion of the South Training Area, within the vicinity of former Maneuver Areas No. 1 and No. 2.

Since the end of World War II major portions of Maneuver Areas No. 1 and No. 2 have been divested from government ownership or lease, and are no longer government property. What remains of former Maneuver Areas No. 1 and No. 2 has been incorporated into the larger range often referred to as the South Training Area, or East Fort Bliss portions of McGregor Range. The range area surrounding the Site has been used for military training since about 1939. The range remains active and training around the Site presently consist mostly of small unit ground troop maneuvers, simulated artillery fire, and combat vehicle maneuvering.

#### **2.1.2 Climate and Topography**

The climate of Fort Bliss and El Paso, Texas is a mostly dry desert climate with very hot summers, usually with little or no humidity, and mild, dry winters. Rainfall occurs mostly July through September and averages 9.4 inches per year. Some thunderstorms occur during the rainy seasons that occasionally produce flash floods and hail. Wind and dust storms occur

during the spring usually in March through May. June has an average high temperature of 96.2 °F and January an average low temperature of 32.0 °F.

Elevations range from about 3,900 feet above mean sea level (MSL) in the cantonment area to approximately 7,192 feet above MSL on North Franklin Peak of the Franklin Mountains northwest of the Fort Bliss main cantonment. The Site is on flat valley floor with undulating dunes roughly one to four feet in height, with scattered desert scrub brush throughout. There is no evidence of erosion or other movement or transport of the suspected illegally dumped waste piles from the Site.

Otero Mesa is located on the east side of Fort Bliss, while the Sacramento Mountains border Fort Bliss to the northeast. The Hueco Mountains are located east of the Site.

### **2.1.3 Soils and Geology**

The Site soils are composed primarily of sand and gravel with few fines. Surface geological formations consist of young Quaternary alluvial deposits and dunes of windblown sand. The underlying bedrock consists of limestone, sandstone, dolomite, and shale (Barnes et al., 1968). Bedrock depths are highly variable ranging from very shallow adjacent to the mountain slopes, to greater than 3000 feet near the center of the bolson. Depth to bedrock is unknown at the Site but estimated at approximately 500 feet below ground surface (bgs) based on nearby well boring logs (Army, 2004).

### **2.1.4 Hydrogeology and Hydrology**

There are two major groundwater basins at Fort Bliss, the Hueco Bolson and the Mesilla Bolson, which are separated by the Franklin Mountains on the eastern portion of Fort Bliss. The Site is located within the Hueco Bolson basin. Wells from the Hueco Bolson aquifer provide the majority of the water used at Fort Bliss. The Hueco Bolson is located in the southern half of the Tularosa Basin and contains fill material consisting primarily of lacustrine and fluvial deposits (AEM, 2007).

The depth to the groundwater saturated zone below the Site is estimated approximately 365 feet bgs (Army, 2004). The only significant surface water body near Fort Bliss is the Rio Grande River. The Rio Grande River is located approximately 20 miles southwest from the Site. Several intermittent streams are located on Fort Bliss but only flow during major storm events.

## **2.2 Preliminary Assessment Activities**

### **2.2.1 Soil Sampling**

OTIE conducted soil sampling for the PA to investigate the general degree of potential contamination and horizontal limits of the Illegal Dumpsite for preliminary site characterization. Sampling was conducted from 31 March to 9 April 2014 in accordance with the SAP (Appendix C in the Work Plan). In the interest of safety, before soil samples were collected, locations with heavy solid surface debris were gently raked to sweep aside the debris, which in some cases included glass and sharps (syringes). OTIE collected 12 primary soil samples from the areas suspected to contain medical waste: six surface (0-6 inches) and six sub-surface (6-24 inches) samples. OTIE also collected 10% primary duplicate soil samples, 5% matrix spike and matrix spike duplicate, an equipment blank, and a method blank sample. One trip blank was included in each shipped cooler containing volatile organic compounds (VOC) samples. OTIE chemists performed data validation of the laboratory analytical data. Sample locations were determined by Fort Bliss and OTIE personnel during a pre-fieldwork site evaluation.

Soil samples collected from the site were analyzed for the following:

- polychlorinated biphenyl (PCBs) EPA method SW-846 8082,
- VOCs EPA method SW-846 8260,
- semi-volatile organic compounds (SVOCs) EPA method SW-846 8270,
- Pesticides EPA method SW-846 8081A,
- Herbicides EPA method SW-846 8151A,
- 8 RCRA Metals EPA method SW-846 6020,
- Reactivity for Cyanide EPA method SW-846 7.3.3,
- Reactivity for Sulfide EPA method SW-846 7.3.4,
- Corrosivity EPA method SW-846 9045B,
- Ignitability EPA method SW-846 1010A, and
- Total Petroleum Hydrocarbons (TPH) by Texas method 1005/1006.

Sample locations are depicted on Figure 3. Laboratory reports are provided in Appendix A. Analytical data was reviewed and validated by qualified OTIE chemists. Photos of sampling locations are in the Photo Documentation Log in Appendix B.

### **2.2.2 Soil Sampling Results**

The soil sampling results at the Site were predominantly below laboratory detection limits for the majority of samples. Sampling results for Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) are included on Table 1. Results of samples with reported concentrations of potential constituents of concern other than metals above the laboratory detection limit are depicted on Table 2. Analytes not detected are not included on Table 2. Texas Commission on Environmental Quality TRRP Tier 1 Protective Concentration Levels (PCL) Tables for residential soils were used as evaluation of the analytical results. The "Total Combined" (SoilComb) value PCL considers combined dermal, inhalation, and ingestion exposure.

#### Metals

The RCRA 8 metals analyzed exhibited concentrations below TRRP Tier 1 SoilComb PCLs for residential soils in all samples except one. Lead exceeded its residential PCL of 500 milligrams per kilogram (mg/kg) in SS-03 exhibiting a result of 875 mg/kg. However, the result is below the 1600 mg/kg SoilComb Commercial/Industrial PLC for lead in soil.

#### Nonmetals

No samples exhibited concentrations of PCBs, VOCs, SVOCs, Pesticides, or Herbicides at or above TRRP Tier 1 SoilComb PCLs for residential soils. The TRRP Tables do not list PCLs for individual PCB congeners, therefore, the PCL value for total PCBs is shown with the lone aroclor-1016 detection in sample SS-03.

Only surface soil sample SS-06 exhibited concentrations of TPH. The photo log shows that the SS/SB-06 soil sample was collected at a spot of stained, lumpy soil, which could be related to material such as a small dump of oily dirt, or another heavy oily substance, or perhaps decomposing oily rags. SS-06 TPH analyses by Texas Method 1006 (1006 is used to expand upon positive method 1005 detections) show fraction concentrations of aliphatic nC21-nC35 (200 mg/kg) and aromatic nC21-nC35 (37 mg/kg) to be below the TRRP residential soil PCLs of 110,000 mg/kg, and 1,900 mg/kg, respectively. The TRRP itself does not require TPH to be evaluated as a chemical of concern at an affected property. If any action were taken at the Site

under TRRP, then the chemicals of concern to be evaluated under the TRRP, including TPH, would be decided by the party undertaking the corrective action in coordination with the applicable TCEQ program area.

#### Reactivity and Ignitability

All samples showed no reactive cyanide or sulfide constituent. Ignitability was negative for all samples. Analysis of each sample's pH indicated all samples to be noncorrosive, *i.e.*, neither highly acidic nor highly basic.

### **2.2.3 Fence Installation**

OTIE installed fencing and signage in support of interim land use control measures for the suspected illegal dump site. Figure 3 depicts the location of the perimeter fence. The dump site perimeter is approximately 1,320 feet. The fence is a three-strand, 12.5 gauge, smooth wire fence with a double wide gate along the Grey Route. Line posts, pull posts, and corner posts were installed 100 feet apart except where the irregular shape of site perimeter warranted less in order to maintain construction integrity. Pull posts and corner posts were set in concrete. T-posts are 6 feet long with 2 feet hammered into the ground. Four (4) main corner posts were installed at the corners of the site. Corner posts near roadways are mounted with heavy-duty reflectors. Photos of fence installation activities are in the Photo Documentation Log in Appendix B.

A survey of the fence boundary was performed upon completion of construction. Surveying was conducted by professional surveyors registered in the state of Texas, Land-Mark Professional Surveying, Inc., El Paso, TX. The Survey Report is provided in Appendix C.

Warning signs were bolted to fencing pull-posts at approximate 200 foot intervals, which resulted in 7 intervals, with 2 signs per interval, for a total of 14 signs. The signs were constructed to withstand the sun and mounted on the fence posts in a manner to withstand the wind, and minimize to the extent possible wear and tear due to rocking or vibrating caused by prolonged exposure to high winds.

Each pair of signs posted around the perimeter of the Illegal Dump Site contain warnings in English and Spanish as follows:

WARNING  
ENTRY IS PROHIBITED  
No Dumping or Digging Allowed

and

AVISO  
ACCESO PROHIBIDO  
Prohibido tirar o escombros  
Prohibido excavar

Fencing installation and surveying was completed on 11 April 2014. A walk through inspection was conducted on 20 May 2014. A copy of the Site Inspection Technical Memorandum and is included in Appendix D.

### 3.0 PATHWAY AND ENVIRONMENTAL HAZARD ASSESSMENT

#### 3.1 Groundwater

The depth to groundwater is estimated at 365 feet below ground surface (bgs) (Army, 2004). The closest drinking water well is located approximately 2 ¼ miles southwest of the Site near the Homestead Meadows subdivision (TCEQ, 2014a). Due to the low concentrations of constituents and their attenuation on the arid ground surface, and the depth to groundwater, it is highly unlikely that groundwater has been impacted by the illegal dumping at the Site.

#### 3.2 Surface Water

There are no naturally occurring perennial surface water bodies within a one-mile radius of the Site. The closest surface water features are unnamed intermittent gullies, streams, and artificially constructed recharge and flood control ponds to the east of the site. The intermittent streams only flow during major storm events. One stream is located 1 mile to the southeast and the other stream is 1 ½ miles to the northeast and terminates at a pond. Another pond is located ¾ of a mile to the southeast of the Site (EPA, 2014a). These features are upgradient and at higher elevations relative to the Site. There is high probability that surface water has not been impacted by waste piles on the Site.

#### 3.3 Soil Exposure and Air

The Site soil sampling results indicate parameter concentrations predominantly below laboratory detection limits, and all concentrations are below TRRP Tier 1 Soil<sub>Comb</sub> PCLs for residential soils with the exception of lead in one surface soil sample. This sample's lead result is below the Commercial/Industrial PCL. There is no activity on site that would cause site soil particles to become airborne. Fencing has been installed to limit access onto the site thus avoiding potential dermal and inhalation exposure.

#### 3.4 Medical Waste

The veterinary-related debris found at the Site creates a special situation due to its content and age. The original source is not identified, yet for disposal purposes Fort Bliss would most likely be considered the generator. Despite the extended time interval from deposition to the present and extensive weathering, the debris may be considered medical waste due to the presence of sharps.

Apart from potential chemical soil contamination, Title 30 Texas Administrative Code (30 TAC), Chapter 330, Section (§) 330.3 (85)[19][20] defines medical waste as:

*" Treated and untreated special waste from health care-related facilities that is comprised of animal waste, bulk blood, bulk human blood, bulk human body fluids, microbiological waste, pathological waste, **and sharps** as those terms are defined in 25 TAC §1.132 (relating to Definitions) from the sources specified in 25 TAC §1.134 (relating to Application), as well as regulated medical waste as defined in 49 Code of Federal Regulations §173.134(a)(5), except that the term does not include medical waste produced on a farm or ranch as defined in 34 TAC §3.296(f) (relating to Agriculture, Animal Life, Feed, Seed, Plants, and Fertilizer), nor does the term include artificial, nonhuman materials removed from a patient and requested by the patient, including, but not limited to, orthopedic devices and breast implants..."*

Further explanation in 25 TAC, Part 1, Chapter 1, Subchapter K, §1.132 includes sharps in the medical waste definition, more specifically "hypodermic needles" and "hypodermic syringes with attached needles". The type of glassware observed within the Site debris is not described in TAC medical waste definitions. For disposal purposes the Site debris may be considered as

special waste under the same Texas codes because it contains apparent untreated medical waste (used sharps).

## 4.0 SUMMARY AND CONCLUSIONS

The Far East Bliss Illegal Dump Site is a suspected illegal dump site within a controlled access, active training range on Fort Bliss, Texas. Between 3 March and 2 April 2014 OTIE, LLC collected 12 soil samples from the Site; six surface (0-6 inches) and six sub-surface (6-24 inches) samples. The samples were analyzed for multiple parameters and the results were compared to TCEQ TRRP Tier 1 Soil<sub>Comb</sub> PCLs (Tables in Appendix E)-. Concentrations of parameters for all samples are reported below TRRP PCLs for residential soils with the exception of lead at sample location surface sample SS-03. The concentration at this location is below the Commercial/Industrial PCL for lead. This single outlying result indicates that elevated lead levels may be limited to a small portion of the site. It is conceivable the slightly elevated lead concentration could be related to military training activity over the years and not related to the dumped debris. Based on the soil sample results, soils on site would not be considered as hazardous.

Due to the low concentrations of potential constituents of concern, ongoing natural attenuation and weathering of waste piles at the Site, low annual precipitation, and the deep depth to groundwater, it is highly unlikely that groundwater has been or would become impacted by the material on the Far East Bliss Illegal Dump Site. Likewise, for the same reasons it is highly unlikely any of the veterinary-related debris remains infectious or contains other biohazards. Distance to the nearest potential surface water from the Site is at least one mile. It is highly unlikely that surface water has been or would be impacted by the material at the Site.

Based on available information at the time of this preliminary assessment, the Site is not registered with a regulatory agency, is not in the CERCLA program, and is not in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database or included in a RCRA facility permit. Based on the information collected during the soil sampling events and this PA, no contaminant release has occurred that would warrant actions under CERCLA, and the Site may be considered as ineligible for CERCLA response.

The nonsoil debris on the Site is suspected of being illegally dumped decades ago, with the potential medical waste lying exposed to the elements for that time. The original source of the waste is unknown, but is believed to be related to veterinary activities. Due to these unique circumstances, further discussion with TCEQ is advised if the debris is to be disposed, in order to clarify the waste type and classification, and determine an acceptable disposal method. Waste classification would seem to depend on mechanical constituents rather than chemical, since soil analytical results indicate nonhazardous conditions.

## 5.0 REFERENCES

- Barnes, V.E., Shell Oil Co., Cities Service Petroleum Co., Dietrich, J.W., Owen, D.E., Shelby, C.A., Macon, J.W., Bridges, L.W., Evans, G.L., Paulovic, Robert, Bishop, Sam, Jones, T.S., and Amman, Walter. Geologic atlas of Texas, Van Horn-El Paso sheet. 1968.
- Connor, Jon J. and Shacklette, Hansford T. et al. Background Geochemistry of Some Rocks, Soils, Plants, and Vegetables in the Conterminous United States. Geological Survey Professional Paper 574-F, US Geological Survey. United States Government Printing Office, Washington. 1975.
- Engineering-Environmental Management (EEM), Inc. 2007. Final Site Inspection Report, Fort Bliss, Texas, Military Munitions Response Program Site Inspection Munitions Response Sites. January 2007 (Revised April 2007).
- Gates, Joseph Spencer; Stanley, W. D. 1976. Hydrologic interpretation of geophysical data from the southeastern Hueco Bolson, El Paso, and Hudspeth Counties, Texas. USGS Open-File Report: 76-650.
- Oneida Total Integrated Enterprises (OTIE). Work Plan, Preliminary Assessment and Fencing for An Illegal Dump Site at Far East Bliss and Closed Sanitary/Rubble Landfill No. 2 (FTBL-002) Fencing, Fort Bliss, El Paso, El Paso County, Texas. March 2014.
- Texas Commission on Environmental Quality (TCEQ). 2014a. Source Water Assessment Viewer. <http://www.tceq.state.tx.us/gis/swaview>. Accessed August 27, 2014.
- TCEQ. 2014b. Texas Risk Reduction Program (TRRP) Protective Concentration Levels (PCLs). <http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html>. Accessed August 25, 2014, updated November 2014.
- United States Department of the Army (Army). 2004. Final Environmental Impact Statement, Proposed Leasing of Lands at Fort Bliss, Texas for the Proposed Siting, Construction, and Operation by the City of El Paso of a Brackish Water Desalination Plant and Support Facilities. December 2004.
- United States Environmental Protection Agency (EPA). 1994. EPA Memorandum: OSWER Directive: Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. August, 1994.
- United States Environmental Protection Agency (EPA).  
2014a. [http://www.epa.gov/region6/6pd/rcra\\_c/pd-n/screen.htm](http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm). Accessed August 25, 2014.
- U.S. EPA, 2014b. Viewing WATERS Data using Google Earth. [http://water.epa.gov/scitech/datait/tools/waters/tools/waters\\_kmz.cfm#Download](http://water.epa.gov/scitech/datait/tools/waters/tools/waters_kmz.cfm#Download)  
Accessed August 27, 2014.



## Tables



**Table 1**  
**Results - Metals**  
**Illegal Dumping Site in Far East Fort Bliss**  
**Fort Bliss, Texas**

Analyte	Method	Units	TRRP <sup>a</sup> PCL (Tier 1 Comb.) Residential 0.5 Acre	TRRP <sup>a</sup> PCL (Tier 1 Comb.) Residential 30 Acre	Location ID	SS-01	SB-01	SS-02	SB-02	SS-03	SB-03	SS-04	SB-04	SS-05	SS-05	SB-05	SS-06	SB-06	SB-06
					Sample ID	FTBL-SS01	FTBL-SB01	FTBL-SS02	FTBL-SB02	FTBL-SS03	FTBL-SB03	FTBL-SS04	FTBL-SB04	FTBL-SS05	FTBL-SS05-100	FTBL-SB05	FTBL-SS-006	FTBL-SB-006	FTBL-SB-006-100
					Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD
					Sample Date	31-Mar-14	31-Mar-14	31-Mar-14	31-Mar-14	01-Apr-14	01-Apr-14	31-Mar-14	31-Mar-14	31-Mar-14	31-Mar-14	31-Mar-14	09-Apr-14	09-Apr-14	09-Apr-14
Arsenic	SW6020	mg/Kg	24	24		1.59	2.19	4.37	2.19	2.92	1.72	3.41	2.73	1.30	1.29	1.32	1.83	1.78	1.71
Barium	SW6020	mg/Kg	8100	8100		159	43.8	61.9	43.8	333	53.3	99.7	140	26.2	27.4	30.1	35.8	40.2	37.3
Cadmium	SW6020	mg/Kg	520	520		0.308 J	0.948	6.53	0.948	3.21	0.264 J	3.09	3.87	0.0481 J	0.490 U	0.0504 J	0.477 U	0.483 U	0.485 U
Chromium	SW6020	mg/Kg	33000	27000		3.96	18.6	24.7	18.6	18.0	8.08	18.7	12.0	4.00	3.83	3.35	4.15	4.06	4.39
Lead	SW6020	mg/Kg	500	500		7.00	48.2	280	48.2	875 *	29.7	134	145	4.25	4.08	3.15	4.37	4.33	4.69
Mercury	SW7471B	µg/Kg	8300	5500		2.01 J	5.47	6.11	5.47	40.2	1.86 J	14.1	18.7	3.50 U	3.42 U	3.59 U	3.26 J	3.98	3.86
Selenium	SW6020	mg/Kg	310	310		0.318 J	0.361 J	0.370 J	0.361 J	0.324 J	0.233 J	0.288 J	0.268 J	0.325 J	0.230 J	0.312 J	0.394 J	0.302 J	0.374 J
Silver	SW6020	mg/Kg	97	97		0.498 U	0.506 U	0.199 J	0.506 U	2.14	0.132 J	0.0830 J	0.118 J	0.475 U	0.490 U	0.482 U	0.477 U	0.483 U	0.485 U

**Notes:**

a Texas TCEQ TRRP Tier 1 protective concentration levels (PCLs) are the default cleanup standards in the Texas Risk Reduction Program, November 2014 Update, <http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html>

\* Lead (Pb) Commercial/Industrial PCL = **1600 mg/kg**.

FD - Field Duplicate

J - Analyte was positively identified, but the associated numerical value is estimated

mg/kg - milligrams per kilogram

N - Normal Sample

N/A - Not Available

µg/kg - micrograms per kilogram

U - analyte was analyzed for, but not detected at the specified reporting limit

**Table 2**  
**Detected Results - Nonmetals**  
**Illegal Dumping Site in Far East Fort Bliss**  
**Fort Bliss, Texas**

Sample Location	Sample Type	Sample Date	Method	Analyte	Result	Units	TRRP <sup>a</sup> PCL (Tier 1 Comb.) Residential 0.5 Acre	TRRP <sup>a</sup> PCL (Tier 1 Comb.) Residential 30 Acre
SB-02	N	31-Mar-14	SW8081	4,4'-DDD	3.9	µg/Kg	14000	14000
SB-02	N	31-Mar-14	SW8081	4,4'-DDE	15	µg/Kg	10000	10000
SB-04	N	31-Mar-14	SW8081	4,4'-DDE	7.3	µg/Kg	10000	10000
SS-03	N	01-Apr-14	SW8081	4,4'-DDE	6.1	µg/Kg	10000	10000
SS-04	N	31-Mar-14	SW8081	4,4'-DDE	3.3 J	µg/Kg	10000	10000
SB-02	N	31-Mar-14	SW8081	4,4'-DDT	26	µg/Kg	5400	5400
SS-02	N	31-Mar-14	SW8081	4,4'-DDT	5.1	µg/Kg	5400	5400
SS-04	N	31-Mar-14	SW8081	alpha-BHC	3.4	µg/Kg	260	250
SS-03	N	01-Apr-14	SW8082	Total PCBs (Aroclor 1016) <sup>c</sup>	60	µg/Kg	1100	1100
SS-04	N	31-Mar-14	SW8081	beta-BHC	7.1	µg/Kg	930	920
SB-02	N	31-Mar-14	SW8270	Bis(2-ethylhexyl)phthalate	56 J	µg/Kg	43000	43000
SB-04	N	31-Mar-14	SW8270	Bis(2-ethylhexyl)phthalate	180	µg/Kg	43000	43000
SS-04	N	31-Mar-14	SW8270	Bis(2-ethylhexyl)phthalate	97 J	µg/Kg	43000	43000
SB-02	N	31-Mar-14	SW8270	Butyl benzyl phthalate	150 J	µg/Kg	1600	1600
SS-04	N	31-Mar-14	SW8270	Chrysene	76 J	µg/Kg	5600	5600
SB-04	N	31-Mar-14	SW8260	Dichloromethane (Methylene Chloride)	14	µg/Kg	1600	1500
SS-01	N	31-Mar-14	SW8260	Dichloromethane (Methylene Chloride)	7.2 J	µg/Kg	1600	1500
SS-04	N	31-Mar-14	SW8260	Dichloromethane (Methylene Chloride)	16	µg/Kg	1600	1500
SS-05	FD	31-Mar-14	SW8260	Dichloromethane (Methylene Chloride)	30	µg/Kg	1600	1500
SB-04	N	31-Mar-14	SW8151	Dichlorprop	76	µg/Kg	670	670
SS-05	FD	31-Mar-14	SW8151	Dichlorprop	58	µg/Kg	670	670
SS-06	N	09-Apr-14	SW8151	Dichlorprop	5.2 J	µg/Kg	670	670
SS-02	N	31-Mar-14	SW8081	Dieldrin	2.3 J	µg/Kg	150	150
SB-02	N	31-Mar-14	SW8081	Endrin	8.5	µg/Kg	9000	9000
SS-02	N	31-Mar-14	SW8081	Endrin	1.9 J	µg/Kg	9000	9000
SS-04	N	31-Mar-14	SW8270	Fluoranthene	52 J	µg/Kg	2300000	2300000
SB-04	N	31-Mar-14	SW8081	gamma-Chlordane	1.3 J	µg/Kg	7400	7300
SS-04	N	31-Mar-14	SW8081	Heptachlor	5.6	µg/Kg	130	130
SS-05	FD	31-Mar-14	SW8260	Isopropylbenzene (Cumene)	2.5 J	µg/Kg	4300000	3000000
SS-01	N	31-Mar-14	SW8270	Phenol	35 J	µg/Kg	2000000	2000000
SB-02	N	31-Mar-14	SW8260	Toluene	1.9 J	µg/Kg	5900000	5400000
SB-04	N	31-Mar-14	SW8260	Toluene	1.8 J	µg/Kg	5900000	5400000
SS-01	N	31-Mar-14	SW8260	Toluene	1.1 J	µg/Kg	5900000	5400000
SS-04	N	31-Mar-14	SW8260	Toluene	3.0 J	µg/Kg	5900000	5400000
SS-05	N	31-Mar-14	SW8260	Toluene	1.3 J	µg/Kg	5900000	5400000
SS-05	FD	31-Mar-14	SW8260	Toluene	11	µg/Kg	5900000	5400000
<b>TPH</b>								
Sample Location	Sample Type	Sample Date	Method	Analyte	Result	Units	TRRP <sup>a</sup> PCL (Tier 1 Comb.) Residential 0.5 Acre	TRRP <sup>a</sup> PCL (Tier 1 Comb.) Residential 30 Acre
SS-06	N	09-Apr-14	TX1006	Total Aliphatic Fraction	200	mg/Kg	N/A	N/A
SS-06	N	09-Apr-14	TX1006	Total Aromatic Fraction	37	mg/Kg	N/A	N/A
SS-06	N	09-Apr-14	TX1005	Total Petroleum Hydrocarbon	280	mg/Kg	N/A	N/A
SS-06	N	09-Apr-14	TX1006	Total Petroleum Hydrocarbons	240	mg/Kg	N/A	N/A
SS-06	N	09-Apr-14	TX1005	>nC12 to nC28	65 J	mg/Kg	2300000	2000000
SS-06	N	09-Apr-14	TX1005	>nC28 to nC35	210	mg/Kg	2300000	2000000
SS-06	N	09-Apr-14	TX1006	Aliphatics >nC21 to nC35	200	mg/Kg	110000	110000
SS-06	N	09-Apr-14	TX1006	Aliphatics Relative % Distribution	84	mg/Kg	N/A	N/A
SS-06	N	09-Apr-14	TX1006	Aromatics >nC21 to nC35	37	mg/Kg	1900	1900
SS-06	N	09-Apr-14	TX1006	Aromatics Relative % Distribution	16	mg/Kg	N/A	N/A

**Notes:**

<sup>a</sup> Texas TCEQ TRRP Tier 1 protective concentration levels (PCLs) are the default cleanup standards in the Texas Risk Reduction Program, November 2014 Update, <http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html>

FD - Field Duplicate

J - Analyte was positively identified, but the associated numerical value is estimated

mg/kg - milligrams per kilogram

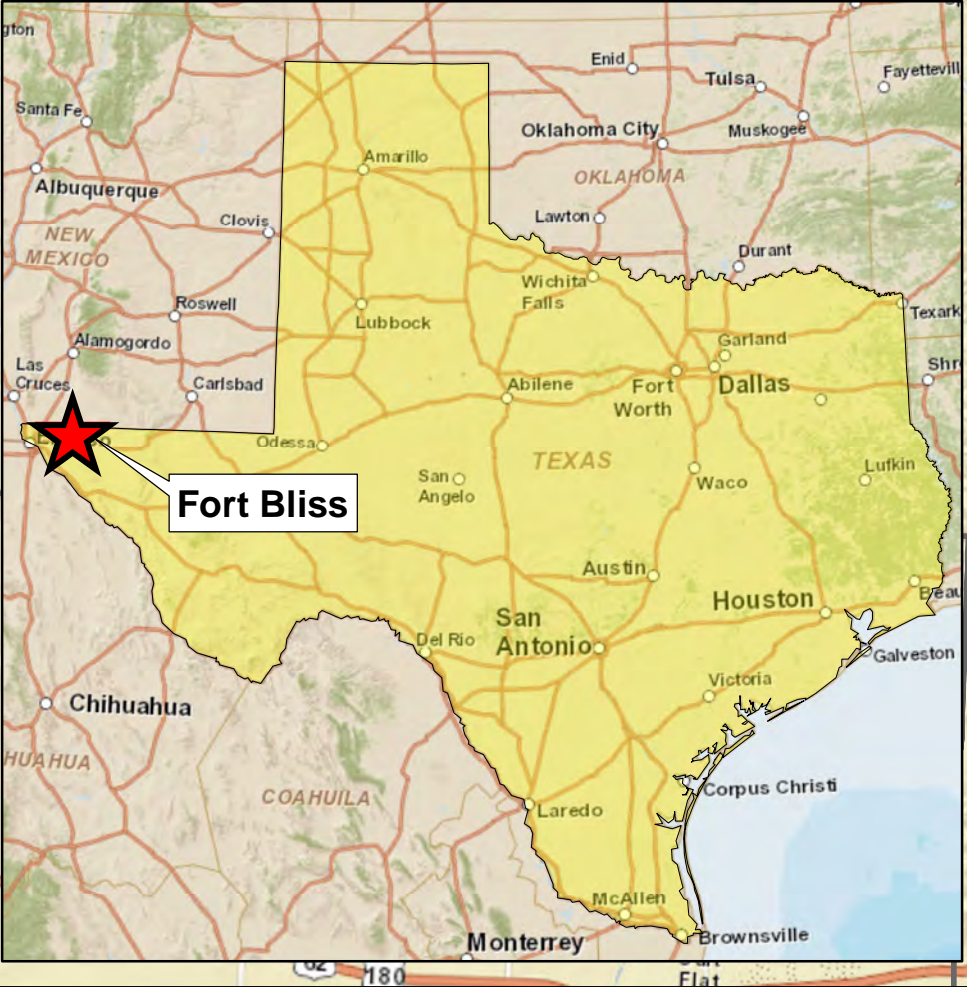
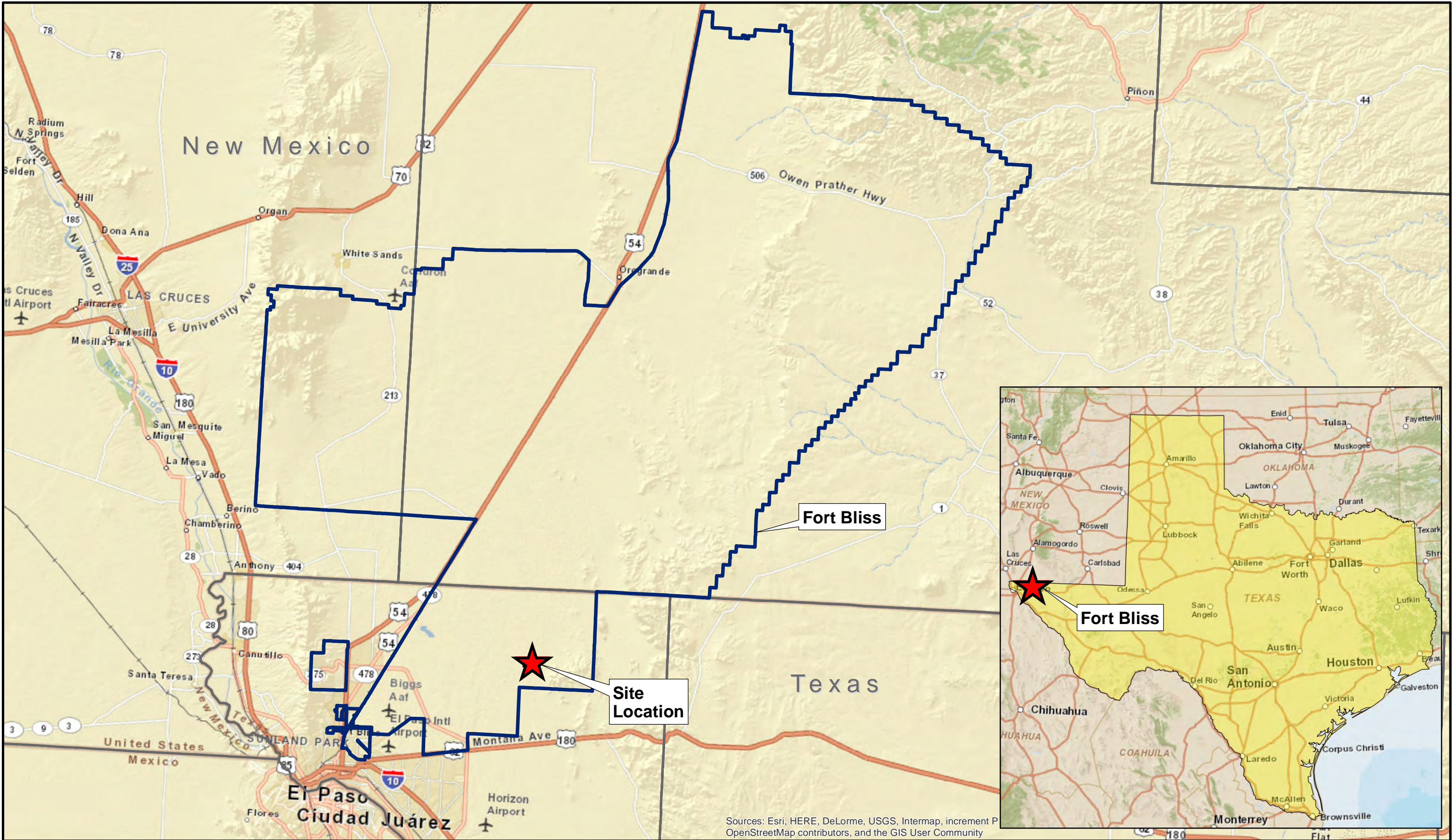
N - Normal Sample

N/A - Not Applicable

µg/kg - micrograms per kilogram (=mg/kg x 1000)

## Figures





**OTIE**  
Oneida Total Integrated Enterprises

**LEGEND**

- Fort Bliss Boundary
- County Boundary

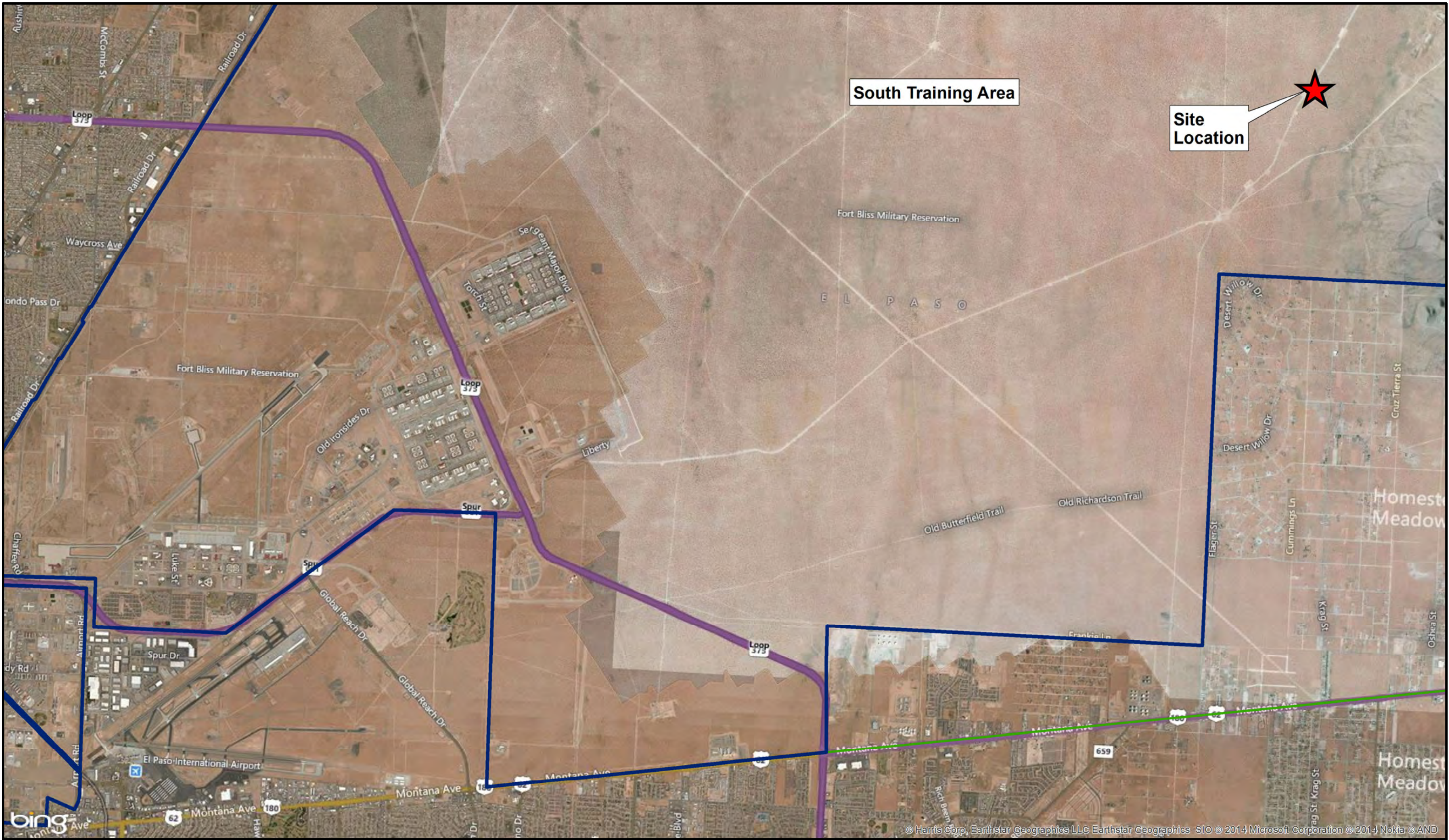
N

0 5 10 15 20  
Miles

**FIGURE 1**  
**LOCATION AND VICINITY MAP:**  
**FORT BLISS, TEXAS**

**FORT BLISS**  
**TEXAS**





	<p><b>LEGEND</b></p> <p><span style="border: 2px solid blue; display: inline-block; width: 20px; height: 10px;"></span> Fort Bliss Boundary</p> <p><span style="border: 2px solid green; display: inline-block; width: 20px; height: 10px;"></span> Maneuver Areas No. 1 and No. 2</p> <div style="text-align: center;"> <p>N</p> <p>0 2,500 5,000 7,500 10,000</p> <p>Feet</p> </div>	<p align="center"><b>FIGURE 2</b></p> <p align="center"><b>SITE LOCATION MAP:</b></p> <p align="center"><b>ILLEGAL DUMP SITE IN FAR EAST FORT BLISS</b></p>	<p align="center"><b>FORT BLISS</b></p> <p align="center"><b>TEXAS</b></p>
--	--	---	--



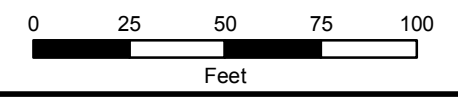


bing



**LEGEND**

- Sample Point
- Wire Fence



**FIGURE 3**  
**SITE MAP AND SAMPLE LOCATIONS:**  
**ILLEGAL DUMPING SITE IN FAR EAST FORT BLISS**

**FORT BLISS**  
**TEXAS**



## **Appendix A**

### **Laboratory Results**



FTBL-SS-01



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS01  
 Collection Date: 31-Mar-2014 14:25

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-07  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		1.9	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,1,2,2-Tetrachloroethane	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.4	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,1,2-Trichloroethane	U		2.2	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,1-Dichloroethane	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,1-Dichloroethene	U		1.7	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,2,4-Trichlorobenzene	U		1.0	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,2-Dibromo-3-chloropropane	U		1.4	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,2-Dibromoethane	U		0.78	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,2-Dichlorobenzene	U		0.89	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,2-Dichloroethane	U		0.66	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,2-Dichloropropane	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,3-Dichlorobenzene	U		1.0	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
1,4-Dichlorobenzene	U		0.78	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
2-Butanone	U		2.4	11	ug/Kg-dry	1	07-Apr-2014 18:11
2-Hexanone	U		1.9	11	ug/Kg-dry	1	07-Apr-2014 18:11
4-Methyl-2-pentanone	U		1.1	11	ug/Kg-dry	1	07-Apr-2014 18:11
Acetone	U		5.1	22	ug/Kg-dry	1	07-Apr-2014 18:11
Benzene	U		0.66	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Bromodichloromethane	U		0.66	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Bromoform	U		0.78	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Bromomethane	U		1.1	11	ug/Kg-dry	1	07-Apr-2014 18:11
Carbon disulfide	U		1.8	11	ug/Kg-dry	1	07-Apr-2014 18:11
Carbon tetrachloride	U		1.3	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Chlorobenzene	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Chloroethane	U		1.1	11	ug/Kg-dry	1	07-Apr-2014 18:11
Chloroform	U		2.0	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Chloromethane	U		1.0	11	ug/Kg-dry	1	07-Apr-2014 18:11
cis-1,2-Dichloroethene	U		1.7	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
cis-1,3-Dichloropropene	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Cyclohexane	U	n	1.3	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Dibromochloromethane	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Dichlorodifluoromethane	U		2.0	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
<b>Dichloromethane</b>	<b>7.2</b>	<b>J</b>	<b>1.6</b>	<b>11</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>07-Apr-2014 18:11</b>
Ethylbenzene	U		1.0	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Isopropylbenzene	U		1.1	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
m,p-Xylene	U		1.9	11	ug/Kg-dry	1	07-Apr-2014 18:11
Methyl acetate	U		1.1	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Methyl tert-butyl ether	U		2.1	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Methylcyclohexane	U		1.7	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
o-Xylene	U		1.1	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Styrene	U		0.66	5.5	ug/Kg-dry	1	07-Apr-2014 18:11

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS01  
 Collection Date: 31-Mar-2014 14:25

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-07  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
Tetrachloroethene	U		1.1	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
<b>Toluene</b>	<b>1.1</b>	<b>J</b>	<b>0.78</b>	<b>5.5</b>	<b>ug/Kg-dry</b>	<b>1</b>	07-Apr-2014 18:11
trans-1,2-Dichloroethene	U		1.0	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
trans-1,3-Dichloropropene	U		0.55	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Trichloroethene	U		1.8	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Trichlorofluoromethane	U		0.89	5.5	ug/Kg-dry	1	07-Apr-2014 18:11
Vinyl chloride	U		1.1	2.2	ug/Kg-dry	1	07-Apr-2014 18:11
Xylenes, Total	U		2.9	17	ug/Kg-dry	1	07-Apr-2014 18:11
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>83.1</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 18:11</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>87.2</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 18:11</i>
<i>Surr: Dibromofluoromethane</i>	<i>91.4</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 18:11</i>
<i>Surr: Toluene-d8</i>	<i>99.6</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 18:11</i>
<b>TEXAS TPH - TX1005</b>			<b>Method: TX1005</b>			Prep: TX1005PR / 02-Apr-2014	
nC6 to nC12	U		20	100	mg/Kg-dry	1	03-Apr-2014 12:10
>nC12 to nC28	U		20	100	mg/Kg-dry	1	03-Apr-2014 12:10
>nC28 to nC35	U		20	100	mg/Kg-dry	1	03-Apr-2014 12:10
Total Petroleum Hydrocarbon	U		20	100	mg/Kg-dry	1	03-Apr-2014 12:10
<i>Surr: 2-Fluorobiphenyl</i>	<i>85.6</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 12:10</i>
<i>Surr: Trifluoromethyl benzene</i>	<i>89.6</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 12:10</i>
<b>MOISTURE</b>			<b>Method: SW3550</b>			Analyst: KAH	
<b>Percent Moisture</b>	<b>0.719</b>		<b>0.0100</b>	<b>0.0100</b>	<b>wt%</b>	<b>1</b>	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS01  
 Collection Date: 31-Mar-2014 14:25

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-04  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		41	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:33
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
2-Chlorophenol	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:33
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	07-Apr-2014 16:33
2-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
2-Nitroaniline	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:33
2-Nitrophenol	U		18	170	ug/Kg-dry	1	07-Apr-2014 16:33
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	07-Apr-2014 16:33
3-Nitroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:33
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
4-Chloro-3-methylphenol	U		33	170	ug/Kg-dry	1	07-Apr-2014 16:33
4-Chloroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:33
4-Nitroaniline	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
4-Nitrophenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:33
Acenaphthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
Acenaphthylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Acetophenone	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Anthracene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Atrazine	U		40	170	ug/Kg-dry	1	07-Apr-2014 16:33
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:33
Benzaldehyde	U	n	40	170	ug/Kg-dry	1	07-Apr-2014 16:33
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Caprolactam	U		52	170	ug/Kg-dry	1	07-Apr-2014 16:33
Carbazole	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS01  
 Collection Date: 31-Mar-2014 14:25

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-04  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:33
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
Dibenzofuran	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
Diethyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	07-Apr-2014 16:33
Fluoranthene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
Fluorene	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:33
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:33
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
Hexachloroethane	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
Isophorone	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Naphthalene	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:33
Nitrobenzene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:33
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:33
Pentachlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:33
Phenanthrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:33
<b>Phenol</b>	<b>35</b>	<b>J</b>	<b>11</b>	<b>170</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>07-Apr-2014 16:33</b>
Pyrene	U		43	170	ug/Kg-dry	1	07-Apr-2014 16:33
<i>Surr: 2,4,6-Tribromophenol</i>	86.2			36-126	%REC	1	07-Apr-2014 16:33
<i>Surr: 2-Fluorobiphenyl</i>	63.1			43-125	%REC	1	07-Apr-2014 16:33
<i>Surr: 2-Fluorophenol</i>	53.7			37-125	%REC	1	07-Apr-2014 16:33
<i>Surr: 4-Terphenyl-d14</i>	72.5			32-125	%REC	1	07-Apr-2014 16:33
<i>Surr: Nitrobenzene-d5</i>	66.9			37-125	%REC	1	07-Apr-2014 16:33
<i>Surr: Phenol-d6</i>	58.5			40-125	%REC	1	07-Apr-2014 16:33
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.3	ug/Kg-dry	1	17-Apr-2014 05:27
2,4,5-TP (Silvex)	U		1.7	3.3	ug/Kg-dry	1	17-Apr-2014 05:27
2,4-D	U		0.71	6.7	ug/Kg-dry	1	17-Apr-2014 05:27
2,4-DB	U		0.91	6.7	ug/Kg-dry	1	17-Apr-2014 05:27
Dalapon	U		1.2	3.3	ug/Kg-dry	1	17-Apr-2014 05:27
Dicamba	U		1.3	3.3	ug/Kg-dry	1	17-Apr-2014 05:27
Dichlorprop	U		1.6	6.7	ug/Kg-dry	1	17-Apr-2014 05:27
Dinoseb	U		1.4	3.3	ug/Kg-dry	1	17-Apr-2014 05:27
MCPA	U		100	670	ug/Kg-dry	1	17-Apr-2014 05:27
MCPP	U		160	670	ug/Kg-dry	1	17-Apr-2014 05:27
<i>Surr: DCAA</i>	42.8			30-150	%REC	1	17-Apr-2014 05:27

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS01  
 Collection Date: 31-Mar-2014 14:25

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-04  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.50	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
4,4'-DDE	U		0.50	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
4,4'-DDT	U		0.50	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
Aldrin	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
alpha-BHC	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
beta-BHC	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
Chlordane	U		2.0	17	ug/Kg-dry	1	10-Apr-2014 04:07
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
Dieldrin	U		0.50	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
Endosulfan II	U		0.60	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
Endosulfan sulfate	U		0.60	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
Endrin	U		0.60	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
Endrin aldehyde	U		0.60	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
Endrin ketone	U		0.60	3.3	ug/Kg-dry	1	10-Apr-2014 04:07
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
Heptachlor	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
Methoxychlor	U		3.4	17	ug/Kg-dry	1	10-Apr-2014 04:07
Toxaphene	U		4.8	17	ug/Kg-dry	1	10-Apr-2014 04:07
Surr: Decachlorobiphenyl	113			59-144	%REC	1	10-Apr-2014 04:07
Surr: Tetrachloro-m-xylene	84.8			56.9-130	%REC	1	10-Apr-2014 04:07
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:07
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>				Analyst: SE	
Aroclor 1016	U		4.2	17	ug/Kg-dry	1	08-Apr-2014 02:01
Aroclor 1221	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:01
Aroclor 1232	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:01
Aroclor 1242	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:01
Aroclor 1248	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:01
Aroclor 1254	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:01
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	08-Apr-2014 02:01
Surr: Decachlorobiphenyl	108			54-143	%REC	1	08-Apr-2014 02:01
Surr: Tetrachloro-m-xylene	77.4			55-137	%REC	1	08-Apr-2014 02:01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS01  
 Collection Date: 31-Mar-2014 14:25

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-04  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 08-Apr-2014		Analyst: ALR	
Arsenic	1.59		0.0995	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
Barium	159		0.0796	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
Cadmium	0.308	J	0.0498	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
Chromium	3.96		0.0896	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
Lead	7.00		0.0498	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
Selenium	0.318	J	0.179	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
Silver	U		0.0796	0.498	mg/Kg-dry	1	08-Apr-2014 15:18
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	08-Apr-2014 17:33
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 08-Apr-2014		Analyst: OFO	
Mercury	2.01	J	0.489	3.46	ug/Kg-dry	1	08-Apr-2014 14:22
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	1.21		0.0100	0.0100	wt%	1	03-Apr-2014 15:50
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	8.20	H	0.100	0.100	pH Units	1	08-Apr-2014 17:26
Temp Deg C @pH	21.3	H	0	0	pH Units	1	08-Apr-2014 17:26
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	08-Apr-2014 10:30
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	08-Apr-2014 09:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SB-01



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB01  
 Collection Date: 31-Mar-2014 14:35

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-04  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		2.2	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,1,2,2-Tetrachloroethane	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.7	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,1,2-Trichloroethane	U		2.6	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,1-Dichloroethane	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,1-Dichloroethene	U		2.0	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,2,4-Trichlorobenzene	U		1.2	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,2-Dibromo-3-chloropropane	U		1.7	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,2-Dibromoethane	U		0.92	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,2-Dichlorobenzene	U		1.1	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,2-Dichloroethane	U		0.79	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,2-Dichloropropane	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,3-Dichlorobenzene	U		1.2	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
1,4-Dichlorobenzene	U		0.92	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
2-Butanone	U		2.9	13	ug/Kg-dry	1	07-Apr-2014 17:00
2-Hexanone	U		2.2	13	ug/Kg-dry	1	07-Apr-2014 17:00
4-Methyl-2-pentanone	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 17:00
Acetone	U		6.1	26	ug/Kg-dry	1	07-Apr-2014 17:00
Benzene	U		0.79	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Bromodichloromethane	U		0.79	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Bromoform	U		0.92	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Bromomethane	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 17:00
Carbon disulfide	U		2.1	13	ug/Kg-dry	1	07-Apr-2014 17:00
Carbon tetrachloride	U		1.6	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Chlorobenzene	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Chloroethane	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 17:00
Chloroform	U		2.4	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Chloromethane	U		1.2	13	ug/Kg-dry	1	07-Apr-2014 17:00
cis-1,2-Dichloroethene	U		2.0	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
cis-1,3-Dichloropropene	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Cyclohexane	U	n	1.6	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Dibromochloromethane	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Dichlorodifluoromethane	U		2.4	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Dichloromethane	U		1.8	13	ug/Kg-dry	1	07-Apr-2014 17:00
Ethylbenzene	U		1.2	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Isopropylbenzene	U		1.3	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
m,p-Xylene	U		2.2	13	ug/Kg-dry	1	07-Apr-2014 17:00
Methyl acetate	U		1.3	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Methyl tert-butyl ether	U		2.5	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Methylcyclohexane	U		2.0	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
o-Xylene	U		1.3	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Styrene	U		0.79	6.6	ug/Kg-dry	1	07-Apr-2014 17:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB01  
 Collection Date: 31-Mar-2014 14:35

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-04  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
Tetrachloroethene	U		1.3	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Toluene	U		0.92	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
trans-1,2-Dichloroethene	U		1.2	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
trans-1,3-Dichloropropene	U		0.66	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Trichloroethene	U		2.1	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Trichlorofluoromethane	U		1.1	6.6	ug/Kg-dry	1	07-Apr-2014 17:00
Vinyl chloride	U		1.3	2.6	ug/Kg-dry	1	07-Apr-2014 17:00
Xylenes, Total	U		3.4	20	ug/Kg-dry	1	07-Apr-2014 17:00
Surr: 1,2-Dichloroethane-d4	86.8			70-128	%REC	1	07-Apr-2014 17:00
Surr: 4-Bromofluorobenzene	87.9			73-126	%REC	1	07-Apr-2014 17:00
Surr: Dibromofluoromethane	92.9			71-128	%REC	1	07-Apr-2014 17:00
Surr: Toluene-d8	95.8			73-127	%REC	1	07-Apr-2014 17:00
<b>TEXAS TPH - TX1005</b>			<b>Method: TX1005</b>		Prep: TX1005PR / 02-Apr-2014		Analyst: RPM
nC6 to nC12	U		22	110	mg/Kg-dry	1	03-Apr-2014 10:42
>nC12 to nC28	U		22	110	mg/Kg-dry	1	03-Apr-2014 10:42
>nC28 to nC35	U		22	110	mg/Kg-dry	1	03-Apr-2014 10:42
Total Petroleum Hydrocarbon	U		22	110	mg/Kg-dry	1	03-Apr-2014 10:42
Surr: 2-Fluorobiphenyl	84.9			70-130	%REC	1	03-Apr-2014 10:42
Surr: Trifluoromethyl benzene	92.9			70-130	%REC	1	03-Apr-2014 10:42
<b>MOISTURE</b>			<b>Method: SW3550</b>			Analyst: KAH	
Percent Moisture	1.48		0.0100	0.0100	wt%	1	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB01  
 Collection Date: 31-Mar-2014 14:35

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		43	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,4,5-Trichlorophenol	U		22	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,4,6-Trichlorophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,4-Dichlorophenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,4-Dimethylphenol	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,4-Dinitrophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,4-Dinitrotoluene	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	07-Apr-2014 15:48
2-Chloronaphthalene	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
2-Chlorophenol	U		10	170	ug/Kg-dry	1	07-Apr-2014 15:48
2-Methylnaphthalene	U		28	170	ug/Kg-dry	1	07-Apr-2014 15:48
2-Methylphenol	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
2-Nitroaniline	U		17	170	ug/Kg-dry	1	07-Apr-2014 15:48
2-Nitrophenol	U		19	170	ug/Kg-dry	1	07-Apr-2014 15:48
3&4-Methylphenol	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
3,3'-Dichlorobenzidine	U		20	170	ug/Kg-dry	1	07-Apr-2014 15:48
3-Nitroaniline	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
4,6-Dinitro-2-methylphenol	U		17	170	ug/Kg-dry	1	07-Apr-2014 15:48
4-Bromophenyl phenyl ether	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
4-Chloro-3-methylphenol	U		35	170	ug/Kg-dry	1	07-Apr-2014 15:48
4-Chloroaniline	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
4-Chlorophenyl phenyl ether	U		17	170	ug/Kg-dry	1	07-Apr-2014 15:48
4-Nitroaniline	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
4-Nitrophenol	U		17	170	ug/Kg-dry	1	07-Apr-2014 15:48
Acenaphthene	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
Acenaphthylene	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Acetophenone	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Anthracene	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Atrazine	U		42	170	ug/Kg-dry	1	07-Apr-2014 15:48
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	07-Apr-2014 15:48
Benzaldehyde	U	n	42	170	ug/Kg-dry	1	07-Apr-2014 15:48
Benzo(a)pyrene	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Benzo(b)fluoranthene	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Benzo(g,h,i)perylene	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Benzo(k)fluoranthene	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
Bis(2-chloroethoxy)methane	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Bis(2-chloroethyl)ether	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
Bis(2-chloroisopropyl)ether	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Bis(2-ethylhexyl)phthalate	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
Butyl benzyl phthalate	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Caprolactam	U		53	170	ug/Kg-dry	1	07-Apr-2014 15:48
Carbazole	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB01  
 Collection Date: 31-Mar-2014 14:35

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		18	170	ug/Kg-dry	1	07-Apr-2014 15:48
Dibenz(a,h)anthracene	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
Dibenzofuran	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
Diethyl phthalate	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Dimethyl phthalate	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
Di-n-butyl phthalate	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Di-n-octyl phthalate	U		20	170	ug/Kg-dry	1	07-Apr-2014 15:48
Fluoranthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
Fluorene	U		18	170	ug/Kg-dry	1	07-Apr-2014 15:48
Hexachlorobenzene	U		16	170	ug/Kg-dry	1	07-Apr-2014 15:48
Hexachlorobutadiene	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
Hexachlorocyclopentadiene	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
Hexachloroethane	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Indeno(1,2,3-cd)pyrene	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
Isophorone	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Naphthalene	U		14	170	ug/Kg-dry	1	07-Apr-2014 15:48
Nitrobenzene	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
N-Nitrosodi-n-propylamine	U		18	170	ug/Kg-dry	1	07-Apr-2014 15:48
N-Nitrosodiphenylamine	U		13	170	ug/Kg-dry	1	07-Apr-2014 15:48
Pentachlorophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Phenanthrene	U		15	170	ug/Kg-dry	1	07-Apr-2014 15:48
Phenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 15:48
Pyrene	U		45	170	ug/Kg-dry	1	07-Apr-2014 15:48
Surr: 2,4,6-Tribromophenol	82.8			36-126	%REC	1	07-Apr-2014 15:48
Surr: 2-Fluorobiphenyl	67.3			43-125	%REC	1	07-Apr-2014 15:48
Surr: 2-Fluorophenol	57.8			37-125	%REC	1	07-Apr-2014 15:48
Surr: 4-Terphenyl-d14	72.0			32-125	%REC	1	07-Apr-2014 15:48
Surr: Nitrobenzene-d5	69.8			37-125	%REC	1	07-Apr-2014 15:48
Surr: Phenol-d6	58.5			40-125	%REC	1	07-Apr-2014 15:48
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.5	3.5	ug/Kg-dry	1	17-Apr-2014 04:14
2,4,5-TP (Silvex)	U		1.8	3.5	ug/Kg-dry	1	17-Apr-2014 04:14
2,4-D	U		0.73	6.9	ug/Kg-dry	1	17-Apr-2014 04:14
2,4-DB	U		0.94	6.9	ug/Kg-dry	1	17-Apr-2014 04:14
Dalapon	U		1.3	3.5	ug/Kg-dry	1	17-Apr-2014 04:14
Dicamba	U		1.4	3.5	ug/Kg-dry	1	17-Apr-2014 04:14
Dichlorprop	U		1.7	6.9	ug/Kg-dry	1	17-Apr-2014 04:14
Dinoseb	U		1.5	3.5	ug/Kg-dry	1	17-Apr-2014 04:14
MCPA	U		100	690	ug/Kg-dry	1	17-Apr-2014 04:14
MCPP	U		170	690	ug/Kg-dry	1	17-Apr-2014 04:14
Surr: DCAA	78.8			30-150	%REC	1	17-Apr-2014 04:14

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB01  
 Collection Date: 31-Mar-2014 14:35

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.52	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
4,4'-DDE	U		0.52	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
4,4'-DDT	U		0.52	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
Aldrin	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
alpha-BHC	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
beta-BHC	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
Chlordane	U		2.1	17	ug/Kg-dry	1	10-Apr-2014 03:01
delta-BHC	U		0.21	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
Dieldrin	U		0.52	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
Endosulfan I	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
Endosulfan II	U		0.63	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
Endosulfan sulfate	U		0.63	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
Endrin	U		0.63	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
Endrin aldehyde	U		0.63	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
Endrin ketone	U		0.63	3.4	ug/Kg-dry	1	10-Apr-2014 03:01
gamma-BHC	U		0.21	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
Heptachlor	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
Heptachlor epoxide	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
Methoxychlor	U		3.5	17	ug/Kg-dry	1	10-Apr-2014 03:01
Toxaphene	U		5.0	17	ug/Kg-dry	1	10-Apr-2014 03:01
Surr: Decachlorobiphenyl	99.4			59-144	%REC	1	10-Apr-2014 03:01
Surr: Tetrachloro-m-xylene	104			56.9-130	%REC	1	10-Apr-2014 03:01
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.21	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
gamma-Chlordane	U		0.21	1.7	ug/Kg-dry	1	10-Apr-2014 03:01
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>				Analyst: SE	
Aroclor 1016	U		4.4	17	ug/Kg-dry	1	08-Apr-2014 01:31
Aroclor 1221	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:31
Aroclor 1232	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:31
Aroclor 1242	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:31
Aroclor 1248	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:31
Aroclor 1254	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:31
Aroclor 1260	U		2.5	17	ug/Kg-dry	1	08-Apr-2014 01:31
Surr: Decachlorobiphenyl	139			54-143	%REC	1	08-Apr-2014 01:31
Surr: Tetrachloro-m-xylene	112			55-137	%REC	1	08-Apr-2014 01:31

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB01  
 Collection Date: 31-Mar-2014 14:35

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 08-Apr-2014		Analyst: ALR	
Arsenic	1.95		0.103	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
Barium	46.0		0.0826	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
Cadmium	0.0620	J	0.0516	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
Chromium	3.81		0.0929	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
Lead	3.55		0.0516	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
Selenium	0.317	J	0.186	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
Silver	U		0.0826	0.516	mg/Kg-dry	1	08-Apr-2014 15:08
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	08-Apr-2014 17:33
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 08-Apr-2014		Analyst: OFO	
Mercury	1.44	J	0.507	3.59	ug/Kg-dry	1	08-Apr-2014 14:18
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	4.73		0.0100	0.0100	wt%	1	03-Apr-2014 15:50
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	8.44	H	0.100	0.100	pH Units	1	08-Apr-2014 17:26
Temp Deg C @pH	21.5	H	0	0	pH Units	1	08-Apr-2014 17:26
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	07-Apr-2014 10:30
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	07-Apr-2014 11:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SS-02



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS02  
 Collection Date: 31-Mar-2014 15:40

**ANALYTICAL REPORT**

WorkOrder: HS14040054  
 Lab ID: HS14040054-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		2.2	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,1,2,2-Tetrachloroethane	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.7	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,1,2-Trichloroethane	U		2.6	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,1-Dichloroethane	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,1-Dichloroethene	U		1.9	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,2,4-Trichlorobenzene	U		1.2	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,2-Dibromo-3-chloropropane	U		1.7	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,2-Dibromoethane	U		0.90	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,2-Dichlorobenzene	U		1.0	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,2-Dichloroethane	U		0.77	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,2-Dichloropropane	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,3-Dichlorobenzene	U		1.2	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
1,4-Dichlorobenzene	U		0.90	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
2-Butanone	U		2.8	13	ug/Kg-dry	1	08-Apr-2014 11:08
2-Hexanone	U		2.2	13	ug/Kg-dry	1	08-Apr-2014 11:08
4-Methyl-2-pentanone	U		1.3	13	ug/Kg-dry	1	08-Apr-2014 11:08
Acetone	U		5.9	26	ug/Kg-dry	1	08-Apr-2014 11:08
Benzene	U		0.77	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Bromodichloromethane	U		0.77	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Bromoform	U		0.90	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Bromomethane	U		1.3	13	ug/Kg-dry	1	08-Apr-2014 11:08
Carbon disulfide	U		2.1	13	ug/Kg-dry	1	08-Apr-2014 11:08
Carbon tetrachloride	U		1.5	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Chlorobenzene	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Chloroethane	U		1.3	13	ug/Kg-dry	1	08-Apr-2014 11:08
Chloroform	U		2.3	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Chloromethane	U		1.2	13	ug/Kg-dry	1	08-Apr-2014 11:08
cis-1,2-Dichloroethene	U		1.9	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
cis-1,3-Dichloropropene	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Cyclohexane	U	n	1.5	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Dibromochloromethane	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Dichlorodifluoromethane	U		2.3	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Dichloromethane	U		1.8	13	ug/Kg-dry	1	08-Apr-2014 11:08
Ethylbenzene	U		1.2	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Isopropylbenzene	U		1.3	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
m,p-Xylene	U		2.2	13	ug/Kg-dry	1	08-Apr-2014 11:08
Methyl acetate	U		1.3	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Methyl tert-butyl ether	U		2.4	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Methylcyclohexane	U		1.9	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
o-Xylene	U		1.3	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Styrene	U		0.77	6.4	ug/Kg-dry	1	08-Apr-2014 11:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS02  
 Collection Date: 31-Mar-2014 15:40

**ANALYTICAL REPORT**

WorkOrder: HS14040054  
 Lab ID: HS14040054-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method: SW8260</b>				Analyst: WLR	
Tetrachloroethene	U		1.3	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Toluene	U		0.90	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
trans-1,2-Dichloroethene	U		1.2	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
trans-1,3-Dichloropropene	U		0.64	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Trichloroethene	U		2.1	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Trichlorofluoromethane	U		1.0	6.4	ug/Kg-dry	1	08-Apr-2014 11:08
Vinyl chloride	U		1.3	2.6	ug/Kg-dry	1	08-Apr-2014 11:08
Xylenes, Total	U		3.3	19	ug/Kg-dry	1	08-Apr-2014 11:08
<i>Surr: 1,2-Dichloroethane-d4</i>	102			70-128	%REC	1	08-Apr-2014 11:08
<i>Surr: 4-Bromofluorobenzene</i>	97.6			73-126	%REC	1	08-Apr-2014 11:08
<i>Surr: Dibromofluoromethane</i>	98.7			71-128	%REC	1	08-Apr-2014 11:08
<i>Surr: Toluene-d8</i>	104			73-127	%REC	1	08-Apr-2014 11:08
<b>TEXAS TPH - TX1005</b>		<b>Method: TX1005</b>				Prep: TX1005PR / 02-Apr-2014 Analyst: RPM	
nC6 to nC12	U		22	110	mg/Kg-dry	1	03-Apr-2014 12:40
>nC12 to nC28	U		22	110	mg/Kg-dry	1	03-Apr-2014 12:40
>nC28 to nC35	U		22	110	mg/Kg-dry	1	03-Apr-2014 12:40
Total Petroleum Hydrocarbon	U		22	110	mg/Kg-dry	1	03-Apr-2014 12:40
<i>Surr: 2-Fluorobiphenyl</i>	80.1			70-130	%REC	1	03-Apr-2014 12:40
<i>Surr: Trifluoromethyl benzene</i>	83.5			70-130	%REC	1	03-Apr-2014 12:40
<b>MOISTURE</b>		<b>Method: SW3550</b>				Analyst: KAH	
Percent Moisture	0.656		0.0100	0.0100	wt%	1	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS02  
 Collection Date: 31-Mar-2014 15:40

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-03  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		41	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	08-Apr-2014 18:54
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
2-Chlorophenol	U		10	170	ug/Kg-dry	1	08-Apr-2014 18:54
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	08-Apr-2014 18:54
2-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
2-Nitroaniline	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:54
2-Nitrophenol	U		18	170	ug/Kg-dry	1	08-Apr-2014 18:54
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	08-Apr-2014 18:54
3-Nitroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:54
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
4-Chloro-3-methylphenol	U		33	170	ug/Kg-dry	1	08-Apr-2014 18:54
4-Chloroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:54
4-Nitroaniline	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
4-Nitrophenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:54
Acenaphthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
Acenaphthylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Acetophenone	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Anthracene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Atrazine	U		40	170	ug/Kg-dry	1	08-Apr-2014 18:54
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	08-Apr-2014 18:54
Benzaldehyde	U	n	40	170	ug/Kg-dry	1	08-Apr-2014 18:54
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Caprolactam	U		52	170	ug/Kg-dry	1	08-Apr-2014 18:54
Carbazole	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS02  
 Collection Date: 31-Mar-2014 15:40

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-03  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	08-Apr-2014 18:54
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
Dibenzofuran	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
Diethyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	08-Apr-2014 18:54
Fluoranthene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
Fluorene	U		17	170	ug/Kg-dry	1	08-Apr-2014 18:54
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:54
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
Hexachloroethane	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
Isophorone	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Naphthalene	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:54
Nitrobenzene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	08-Apr-2014 18:54
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:54
Pentachlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Phenanthrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:54
Phenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:54
Pyrene	U		43	170	ug/Kg-dry	1	08-Apr-2014 18:54
Surr: 2,4,6-Tribromophenol	68.4			36-126	%REC	1	08-Apr-2014 18:54
Surr: 2-Fluorobiphenyl	58.9			43-125	%REC	1	08-Apr-2014 18:54
Surr: 2-Fluorophenol	46.7			37-125	%REC	1	08-Apr-2014 18:54
Surr: 4-Terphenyl-d14	63.3			32-125	%REC	1	08-Apr-2014 18:54
Surr: Nitrobenzene-d5	53.6			37-125	%REC	1	08-Apr-2014 18:54
Surr: Phenol-d6	50.1			40-125	%REC	1	08-Apr-2014 18:54
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		7.1	17	ug/Kg-dry	5	11-Apr-2014 08:59
2,4,5-TP (Silvex)	U		8.6	17	ug/Kg-dry	5	11-Apr-2014 08:59
2,4-D	U		3.5	33	ug/Kg-dry	5	11-Apr-2014 08:59
2,4-DB	U		4.5	33	ug/Kg-dry	5	11-Apr-2014 08:59
Dalapon	U		6.1	17	ug/Kg-dry	5	11-Apr-2014 08:59
Dicamba	U		6.6	17	ug/Kg-dry	5	11-Apr-2014 08:59
Dichlorprop	U		8.1	33	ug/Kg-dry	5	11-Apr-2014 08:59
Dinoseb	U		7.1	17	ug/Kg-dry	5	11-Apr-2014 08:59
MCPA	U		510	3300	ug/Kg-dry	5	11-Apr-2014 08:59
MCPP	U		810	3300	ug/Kg-dry	5	11-Apr-2014 08:59
Surr: DCAA	49.7			30-150	%REC	5	11-Apr-2014 08:59

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS02  
 Collection Date: 31-Mar-2014 15:40

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-03  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 21:17
4,4'-DDE	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 21:17
<b>4,4'-DDT</b>	<b>5.1</b>		<b>0.50</b>	<b>3.3</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 21:17
Aldrin	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
alpha-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
beta-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
Chlordane	U		2.0	17	ug/Kg-dry	1	17-Apr-2014 21:17
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
<b>Dieldrin</b>	<b>2.3</b>	J	<b>0.50</b>	<b>3.3</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 21:17
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
Endosulfan II	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:17
Endosulfan sulfate	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:17
<b>Endrin</b>	<b>1.9</b>	JP	<b>0.61</b>	<b>3.3</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 21:17
Endrin aldehyde	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:17
Endrin ketone	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:17
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
Heptachlor	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
Methoxychlor	U		3.4	17	ug/Kg-dry	1	17-Apr-2014 21:17
Toxaphene	U		4.8	17	ug/Kg-dry	1	17-Apr-2014 21:17
<i>Surr: Decachlorobiphenyl</i>	79.1			59-144	%REC	1	17-Apr-2014 21:17
<i>Surr: Tetrachloro-m-xylene</i>	97.8			56.9-130	%REC	1	17-Apr-2014 21:17
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:17
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>		Prep:SW3546/3665A / 10-Apr-2014		Analyst: JLJ	
Aroclor 1016	U		4.2	17	ug/Kg-dry	1	15-Apr-2014 08:05
Aroclor 1221	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:05
Aroclor 1232	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:05
Aroclor 1242	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:05
Aroclor 1248	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:05
Aroclor 1254	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:05
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	15-Apr-2014 08:05
<i>Surr: Decachlorobiphenyl</i>	107			54-143	%REC	1	15-Apr-2014 08:05
<i>Surr: Tetrachloro-m-xylene</i>	76.9			55-137	%REC	1	15-Apr-2014 08:05

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS02  
 Collection Date: 31-Mar-2014 15:40

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-03  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 09-Apr-2014		Analyst: ALR	
Arsenic	4.37		0.0983	0.492	mg/Kg-dry	1	10-Apr-2014 02:45
Barium	61.9		0.0787	0.492	mg/Kg-dry	1	10-Apr-2014 02:45
Cadmium	6.53		0.0492	0.492	mg/Kg-dry	1	10-Apr-2014 02:45
Chromium	24.7		0.0885	0.492	mg/Kg-dry	1	10-Apr-2014 02:45
Lead	280		0.492	4.92	mg/Kg-dry	10	10-Apr-2014 18:16
Selenium	0.370	J	0.177	0.492	mg/Kg-dry	1	10-Apr-2014 02:45
Silver	0.199	J	0.0787	0.492	mg/Kg-dry	1	10-Apr-2014 17:03
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	11-Apr-2014 09:18
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 09-Apr-2014		Analyst: OFO	
Mercury	6.11		0.507	3.59	ug/Kg-dry	1	09-Apr-2014 15:08
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	1.38		0.0100	0.0100	wt%	1	07-Apr-2014 12:09
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	7.28	H	0.100	0.100	pH Units	1	11-Apr-2014 15:53
Temp Deg C @pH	24.8	H	0	0	pH Units	1	11-Apr-2014 15:53
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	09-Apr-2014 00:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	09-Apr-2014 13:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SB-02



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB02  
 Collection Date: 31-Mar-2014 15:48

**ANALYTICAL REPORT**

WorkOrder: HS14040054  
 Lab ID: HS14040054-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method: SW8260</b>		Analyst: WLR			
1,1,1-Trichloroethane	U		2.3	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,1,2,2-Tetrachloroethane	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.8	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,1,2-Trichloroethane	U		2.7	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,1-Dichloroethane	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,1-Dichloroethene	U		2.0	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,2,4-Trichlorobenzene	U		1.2	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,2-Dibromo-3-chloropropane	U		1.8	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,2-Dibromoethane	U		0.94	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,2-Dichlorobenzene	U		1.1	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,2-Dichloroethane	U		0.81	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,2-Dichloropropane	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,3-Dichlorobenzene	U		1.2	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
1,4-Dichlorobenzene	U		0.94	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
2-Butanone	U		3.0	13	ug/Kg-dry	1	08-Apr-2014 11:35
2-Hexanone	U		2.3	13	ug/Kg-dry	1	08-Apr-2014 11:35
4-Methyl-2-pentanone	U		1.3	13	ug/Kg-dry	1	08-Apr-2014 11:35
Acetone	U		6.2	27	ug/Kg-dry	1	08-Apr-2014 11:35
Benzene	U		0.81	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Bromodichloromethane	U		0.81	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Bromoform	U		0.94	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Bromomethane	U		1.3	13	ug/Kg-dry	1	08-Apr-2014 11:35
Carbon disulfide	U		2.2	13	ug/Kg-dry	1	08-Apr-2014 11:35
Carbon tetrachloride	U		1.6	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Chlorobenzene	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Chloroethane	U		1.3	13	ug/Kg-dry	1	08-Apr-2014 11:35
Chloroform	U		2.4	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Chloromethane	U		1.2	13	ug/Kg-dry	1	08-Apr-2014 11:35
cis-1,2-Dichloroethene	U		2.0	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
cis-1,3-Dichloropropene	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Cyclohexane	U	n	1.6	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Dibromochloromethane	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Dichlorodifluoromethane	U		2.4	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Dichloromethane	U		1.9	13	ug/Kg-dry	1	08-Apr-2014 11:35
Ethylbenzene	U		1.2	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Isopropylbenzene	U		1.3	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
m,p-Xylene	U		2.3	13	ug/Kg-dry	1	08-Apr-2014 11:35
Methyl acetate	U		1.3	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Methyl tert-butyl ether	U		2.6	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Methylcyclohexane	U		2.0	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
o-Xylene	U		1.3	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Styrene	U		0.81	6.7	ug/Kg-dry	1	08-Apr-2014 11:35

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB02  
 Collection Date: 31-Mar-2014 15:48

**ANALYTICAL REPORT**

WorkOrder:HS14040054  
 Lab ID:HS14040054-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method:SW8260</b>				Analyst: WLR	
Tetrachloroethene	U		1.3	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
<b>Toluene</b>	<b>1.9</b>	<b>J</b>	<b>0.94</b>	<b>6.7</b>	<b>ug/Kg-dry</b>	<b>1</b>	08-Apr-2014 11:35
trans-1,2-Dichloroethene	U		1.2	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
trans-1,3-Dichloropropene	U		0.67	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Trichloroethene	U		2.2	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Trichlorofluoromethane	U		1.1	6.7	ug/Kg-dry	1	08-Apr-2014 11:35
Vinyl chloride	U		1.3	2.7	ug/Kg-dry	1	08-Apr-2014 11:35
Xylenes, Total	U		3.5	20	ug/Kg-dry	1	08-Apr-2014 11:35
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>98.0</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 11:35</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>101</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 11:35</i>
<i>Surr: Dibromofluoromethane</i>	<i>97.0</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 11:35</i>
<i>Surr: Toluene-d8</i>	<i>113</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 11:35</i>
<b>TEXAS TPH - TX1005</b>		<b>Method:TX1005</b>				Prep:TX1005PR / 02-Apr-2014 Analyst: RPM	
nC6 to nC12	U		22	110	mg/Kg-dry	1	03-Apr-2014 13:10
>nC12 to nC28	U		22	110	mg/Kg-dry	1	03-Apr-2014 13:10
>nC28 to nC35	U		22	110	mg/Kg-dry	1	03-Apr-2014 13:10
Total Petroleum Hydrocarbon	U		22	110	mg/Kg-dry	1	03-Apr-2014 13:10
<i>Surr: 2-Fluorobiphenyl</i>	<i>76.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 13:10</i>
<i>Surr: Trifluoromethyl benzene</i>	<i>85.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 13:10</i>
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
<b>Percent Moisture</b>	<b>1.44</b>		<b>0.0100</b>	<b>0.0100</b>	<b>wt%</b>	<b>1</b>	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB02  
 Collection Date: 31-Mar-2014 15:48

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		42	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:56
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
2-Chlorophenol	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:56
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	07-Apr-2014 16:56
2-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
2-Nitroaniline	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:56
2-Nitrophenol	U		18	170	ug/Kg-dry	1	07-Apr-2014 16:56
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	07-Apr-2014 16:56
3-Nitroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:56
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
4-Chloro-3-methylphenol	U		34	170	ug/Kg-dry	1	07-Apr-2014 16:56
4-Chloroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:56
4-Nitroaniline	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
4-Nitrophenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:56
Acenaphthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
Acenaphthylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Acetophenone	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Anthracene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Atrazine	U		41	170	ug/Kg-dry	1	07-Apr-2014 16:56
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:56
Benzaldehyde	U	n	41	170	ug/Kg-dry	1	07-Apr-2014 16:56
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
<b>Bis(2-ethylhexyl)phthalate</b>	<b>56</b>	J	<b>13</b>	<b>170</b>	<b>ug/Kg-dry</b>	1	07-Apr-2014 16:56
<b>Butyl benzyl phthalate</b>	<b>150</b>	J	<b>12</b>	<b>170</b>	<b>ug/Kg-dry</b>	1	07-Apr-2014 16:56
Caprolactam	U		52	170	ug/Kg-dry	1	07-Apr-2014 16:56
Carbazole	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB02  
 Collection Date: 31-Mar-2014 15:48

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:56
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
Dibenzofuran	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
Diethyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	07-Apr-2014 16:56
Fluoranthene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
Fluorene	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:56
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:56
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
Hexachloroethane	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
Isophorone	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Naphthalene	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:56
Nitrobenzene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:56
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:56
Pentachlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Phenanthrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:56
Phenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:56
Pyrene	U		44	170	ug/Kg-dry	1	07-Apr-2014 16:56
<i>Surr: 2,4,6-Tribromophenol</i>	87.3			36-126	%REC	1	07-Apr-2014 16:56
<i>Surr: 2-Fluorobiphenyl</i>	62.4			43-125	%REC	1	07-Apr-2014 16:56
<i>Surr: 2-Fluorophenol</i>	53.3			37-125	%REC	1	07-Apr-2014 16:56
<i>Surr: 4-Terphenyl-d14</i>	71.3			32-125	%REC	1	07-Apr-2014 16:56
<i>Surr: Nitrobenzene-d5</i>	61.8			37-125	%REC	1	07-Apr-2014 16:56
<i>Surr: Phenol-d6</i>	54.1			40-125	%REC	1	07-Apr-2014 16:56
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 03:38
2,4,5-TP (Silvex)	U		1.7	3.4	ug/Kg-dry	1	17-Apr-2014 03:38
2,4-D	U		0.71	6.7	ug/Kg-dry	1	17-Apr-2014 03:38
2,4-DB	U		0.92	6.7	ug/Kg-dry	1	17-Apr-2014 03:38
Dalapon	U		1.2	3.4	ug/Kg-dry	1	17-Apr-2014 03:38
Dicamba	U		1.3	3.4	ug/Kg-dry	1	17-Apr-2014 03:38
Dichlorprop	U		1.6	6.7	ug/Kg-dry	1	17-Apr-2014 03:38
Dinoseb	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 03:38
MCPA	U		100	670	ug/Kg-dry	1	17-Apr-2014 03:38
MCPP	U		160	670	ug/Kg-dry	1	17-Apr-2014 03:38
<i>Surr: DCAA</i>	30.3			30-150	%REC	1	17-Apr-2014 03:38

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB02  
 Collection Date: 31-Mar-2014 15:48

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-01  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
4,4'-DDD	3.9		0.51	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
4,4'-DDE	15	P	0.51	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
4,4'-DDT	26		0.51	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
Aldrin	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
alpha-BHC	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
beta-BHC	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
Chlordane	U		2.0	17	ug/Kg-dry	1	10-Apr-2014 02:45
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
Dieldrin	U		0.51	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
Endosulfan I	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
Endosulfan II	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
Endosulfan sulfate	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
Endrin	8.5		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
Endrin aldehyde	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
Endrin ketone	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 02:45
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
Heptachlor	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
Heptachlor epoxide	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
Methoxychlor	U		3.5	17	ug/Kg-dry	1	10-Apr-2014 02:45
Toxaphene	U		4.9	17	ug/Kg-dry	1	10-Apr-2014 02:45
Surr: Decachlorobiphenyl	118			59-144	%REC	1	10-Apr-2014 02:45
Surr: Tetrachloro-m-xylene	74.4			56.9-130	%REC	1	10-Apr-2014 02:45
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 02:45
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>				Analyst: SE	
Aroclor 1016	U		4.3	17	ug/Kg-dry	1	08-Apr-2014 01:16
Aroclor 1221	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:16
Aroclor 1232	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:16
Aroclor 1242	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:16
Aroclor 1248	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:16
Aroclor 1254	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:16
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	08-Apr-2014 01:16
Surr: Decachlorobiphenyl	135			54-143	%REC	1	08-Apr-2014 01:16
Surr: Tetrachloro-m-xylene	93.0			55-137	%REC	1	08-Apr-2014 01:16

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB02  
 Collection Date: 31-Mar-2014 15:48

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-01  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 08-Apr-2014		Analyst: ALR	
Arsenic	2.19		0.101	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
Barium	43.8		0.0809	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
Cadmium	0.948		0.0506	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
Chromium	18.6		0.0910	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
Lead	48.2		0.0506	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
Selenium	0.361	J	0.182	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
Silver	U		0.0809	0.506	mg/Kg-dry	1	08-Apr-2014 15:03
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	08-Apr-2014 17:33
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 08-Apr-2014		Analyst: OFO	
Mercury	5.47		0.514	3.64	ug/Kg-dry	1	08-Apr-2014 14:16
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	2.02		0.0100	0.0100	wt%	1	03-Apr-2014 15:50
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	8.13	H	0.100	0.100	pH Units	1	08-Apr-2014 17:26
Temp Deg C @pH	21.6	H	0	0	pH Units	1	08-Apr-2014 17:26
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	07-Apr-2014 10:30
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	07-Apr-2014 11:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SS-03



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS03  
 Collection Date: 01-Apr-2014 10:20

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-06  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		1.7	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,1,2,2-Tetrachloroethane	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.3	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,1,2-Trichloroethane	U		2.0	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,1-Dichloroethane	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,1-Dichloroethene	U		1.5	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,2,4-Trichlorobenzene	U		0.90	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,2-Dibromo-3-chloropropane	U		1.3	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,2-Dibromoethane	U		0.70	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,2-Dichlorobenzene	U		0.80	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,2-Dichloroethane	U		0.60	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,2-Dichloropropane	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,3-Dichlorobenzene	U		0.90	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
1,4-Dichlorobenzene	U		0.70	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
2-Butanone	U		2.2	10	ug/Kg-dry	1	08-Apr-2014 12:02
2-Hexanone	U		1.7	10	ug/Kg-dry	1	08-Apr-2014 12:02
4-Methyl-2-pentanone	U		1.0	10	ug/Kg-dry	1	08-Apr-2014 12:02
Acetone	U		4.6	20	ug/Kg-dry	1	08-Apr-2014 12:02
Benzene	U		0.60	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Bromodichloromethane	U		0.60	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Bromoform	U		0.70	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Bromomethane	U		1.0	10	ug/Kg-dry	1	08-Apr-2014 12:02
Carbon disulfide	U		1.6	10	ug/Kg-dry	1	08-Apr-2014 12:02
Carbon tetrachloride	U		1.2	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Chlorobenzene	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Chloroethane	U		1.0	10	ug/Kg-dry	1	08-Apr-2014 12:02
Chloroform	U		1.8	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Chloromethane	U		0.90	10	ug/Kg-dry	1	08-Apr-2014 12:02
cis-1,2-Dichloroethene	U		1.5	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
cis-1,3-Dichloropropene	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Cyclohexane	U	n	1.2	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Dibromochloromethane	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Dichlorodifluoromethane	U		1.8	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Dichloromethane	U		1.4	10	ug/Kg-dry	1	08-Apr-2014 12:02
Ethylbenzene	U		0.90	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Isopropylbenzene	U		1.0	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
m,p-Xylene	U		1.7	10	ug/Kg-dry	1	08-Apr-2014 12:02
Methyl acetate	U		1.0	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Methyl tert-butyl ether	U		1.9	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Methylcyclohexane	U		1.5	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
o-Xylene	U		1.0	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Styrene	U		0.60	5.0	ug/Kg-dry	1	08-Apr-2014 12:02

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS03  
 Collection Date: 01-Apr-2014 10:20

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-06  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method:SW8260</b>				Analyst: WLR	
Tetrachloroethene	U		1.0	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Toluene	U		0.70	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
trans-1,2-Dichloroethene	U		0.90	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
trans-1,3-Dichloropropene	U		0.50	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Trichloroethene	U		1.6	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Trichlorofluoromethane	U		0.80	5.0	ug/Kg-dry	1	08-Apr-2014 12:02
Vinyl chloride	U		1.0	2.0	ug/Kg-dry	1	08-Apr-2014 12:02
Xylenes, Total	U		2.6	15	ug/Kg-dry	1	08-Apr-2014 12:02
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>94.8</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 12:02</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>98.2</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 12:02</i>
<i>Surr: Dibromofluoromethane</i>	<i>95.2</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 12:02</i>
<i>Surr: Toluene-d8</i>	<i>104</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 12:02</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS03  
 Collection Date: 01-Apr-2014 10:20

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-07  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		41	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:58
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
2-Chlorophenol	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:58
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	08-Apr-2014 19:58
2-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
2-Nitroaniline	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:58
2-Nitrophenol	U		18	170	ug/Kg-dry	1	08-Apr-2014 19:58
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	08-Apr-2014 19:58
3-Nitroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:58
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
4-Chloro-3-methylphenol	U		33	170	ug/Kg-dry	1	08-Apr-2014 19:58
4-Chloroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:58
4-Nitroaniline	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
4-Nitrophenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:58
Acenaphthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
Acenaphthylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Acetophenone	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Anthracene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Atrazine	U		40	170	ug/Kg-dry	1	08-Apr-2014 19:58
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:58
Benzaldehyde	U	n	40	170	ug/Kg-dry	1	08-Apr-2014 19:58
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Caprolactam	U		52	170	ug/Kg-dry	1	08-Apr-2014 19:58
Carbazole	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS03  
 Collection Date: 01-Apr-2014 10:20

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-07  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:58
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
Dibenzofuran	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
Diethyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	08-Apr-2014 19:58
Fluoranthene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
Fluorene	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:58
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:58
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
Hexachloroethane	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
Isophorone	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Naphthalene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:58
Nitrobenzene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:58
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:58
Pentachlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Phenanthrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:58
Phenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:58
Pyrene	U		44	170	ug/Kg-dry	1	08-Apr-2014 19:58
<i>Surr: 2,4,6-Tribromophenol</i>	50.6			36-126	%REC	1	08-Apr-2014 19:58
<i>Surr: 2-Fluorobiphenyl</i>	48.2			43-125	%REC	1	08-Apr-2014 19:58
<i>Surr: 2-Fluorophenol</i>	38.8			37-125	%REC	1	08-Apr-2014 19:58
<i>Surr: 4-Terphenyl-d14</i>	62.2			32-125	%REC	1	08-Apr-2014 19:58
<i>Surr: Nitrobenzene-d5</i>	42.7			37-125	%REC	1	08-Apr-2014 19:58
<i>Surr: Phenol-d6</i>	42.0			40-125	%REC	1	08-Apr-2014 19:58
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.3	ug/Kg-dry	1	17-Apr-2014 02:24
2,4,5-TP (Silvex)	U		1.7	3.3	ug/Kg-dry	1	17-Apr-2014 02:24
2,4-D	U		0.71	6.7	ug/Kg-dry	1	17-Apr-2014 02:24
2,4-DB	U		0.91	6.7	ug/Kg-dry	1	17-Apr-2014 02:24
Dalapon	U		1.2	3.3	ug/Kg-dry	1	17-Apr-2014 02:24
Dicamba	U		1.3	3.3	ug/Kg-dry	1	17-Apr-2014 02:24
Dichlorprop	U		1.6	6.7	ug/Kg-dry	1	17-Apr-2014 02:24
Dinoseb	U		1.4	3.3	ug/Kg-dry	1	17-Apr-2014 02:24
MCPA	U		100	670	ug/Kg-dry	1	17-Apr-2014 02:24
MCPP	U		160	670	ug/Kg-dry	1	17-Apr-2014 02:24
<i>Surr: DCAA</i>	31.2			30-150	%REC	1	17-Apr-2014 02:24

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS03  
 Collection Date: 01-Apr-2014 10:20

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-07  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.51	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
<b>4,4'-DDE</b>	<b>6.1</b>		<b>0.51</b>	<b>3.3</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 22:40
4,4'-DDT	U		0.51	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
Aldrin	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
alpha-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
beta-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
Chlordane	U		2.0	17	ug/Kg-dry	1	17-Apr-2014 22:40
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
Dieldrin	U		0.51	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
Endosulfan II	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
Endosulfan sulfate	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
Endrin	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
Endrin aldehyde	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
Endrin ketone	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:40
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
Heptachlor	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
Methoxychlor	U		3.4	17	ug/Kg-dry	1	17-Apr-2014 22:40
Toxaphene	U		4.9	17	ug/Kg-dry	1	17-Apr-2014 22:40
Surr: Decachlorobiphenyl	109			59-144	%REC	1	17-Apr-2014 22:40
Surr: Tetrachloro-m-xylene	119			56.9-130	%REC	1	17-Apr-2014 22:40
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:40
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>		Prep:SW3546/3665A / 10-Apr-2014		Analyst: JLJ	
<b>Aroclor 1016</b>	<b>60</b>		<b>4.3</b>	<b>17</b>	<b>ug/Kg-dry</b>	1	18-Apr-2014 20:52
Aroclor 1221	U		17	17	ug/Kg-dry	1	18-Apr-2014 20:52
Aroclor 1232	U		17	17	ug/Kg-dry	1	18-Apr-2014 20:52
Aroclor 1242	U		17	17	ug/Kg-dry	1	18-Apr-2014 20:52
Aroclor 1248	U		17	17	ug/Kg-dry	1	18-Apr-2014 20:52
Aroclor 1254	U		17	17	ug/Kg-dry	1	18-Apr-2014 20:52
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	18-Apr-2014 20:52
Surr: Decachlorobiphenyl	82.3			54-143	%REC	1	18-Apr-2014 20:52
Surr: Tetrachloro-m-xylene	74.8			55-137	%REC	1	18-Apr-2014 20:52

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS03  
 Collection Date: 01-Apr-2014 10:20

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-07  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 09-Apr-2014		Analyst: ALR	
Arsenic	2.92		0.0958	0.479	mg/Kg-dry	1	10-Apr-2014 03:00
Barium	333		1.53	9.58	mg/Kg-dry	20	11-Apr-2014 13:11
Cadmium	3.21		0.0479	0.479	mg/Kg-dry	1	10-Apr-2014 03:00
Chromium	18.0		0.0862	0.479	mg/Kg-dry	1	10-Apr-2014 03:00
Lead	875		0.958	9.58	mg/Kg-dry	20	11-Apr-2014 13:11
Selenium	0.324	J	0.172	0.479	mg/Kg-dry	1	10-Apr-2014 03:00
Silver	2.14		0.0766	0.479	mg/Kg-dry	1	10-Apr-2014 17:28
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	11-Apr-2014 09:18
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 09-Apr-2014		Analyst: OFO	
Mercury	40.2		0.498	3.53	ug/Kg-dry	1	09-Apr-2014 15:18
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	1.49		0.0100	0.0100	wt%	1	07-Apr-2014 12:09
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	8.24	H	0.100	0.100	pH Units	1	11-Apr-2014 15:53
Temp Deg C @pH	24.0	H	0	0	pH Units	1	11-Apr-2014 15:53
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	09-Apr-2014 00:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	09-Apr-2014 13:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SB-03



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB03  
 Collection Date: 01-Apr-2014 10:40

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		1.7	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,1,2,2-Tetrachloroethane	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,1,2-Trichloro-1,2,2-trifluoroethane	U		1.3	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,1,2-Trichloroethane	U		2.1	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,1-Dichloroethane	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,1-Dichloroethene	U		1.5	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,2,4-Trichlorobenzene	U		0.92	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,2-Dibromo-3-chloropropane	U		1.3	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,2-Dibromoethane	U		0.72	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,2-Dichlorobenzene	U		0.82	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,2-Dichloroethane	U		0.62	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,2-Dichloropropane	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,3-Dichlorobenzene	U		0.92	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
1,4-Dichlorobenzene	U		0.72	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
2-Butanone	U		2.3	10	ug/Kg-dry	1	08-Apr-2014 15:08
2-Hexanone	U		1.7	10	ug/Kg-dry	1	08-Apr-2014 15:08
4-Methyl-2-pentanone	U		1.0	10	ug/Kg-dry	1	08-Apr-2014 15:08
Acetone	U		4.7	21	ug/Kg-dry	1	08-Apr-2014 15:08
Benzene	U		0.62	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Bromodichloromethane	U		0.62	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Bromoform	U		0.72	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Bromomethane	U		1.0	10	ug/Kg-dry	1	08-Apr-2014 15:08
Carbon disulfide	U		1.6	10	ug/Kg-dry	1	08-Apr-2014 15:08
Carbon tetrachloride	U		1.2	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Chlorobenzene	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Chloroethane	U		1.0	10	ug/Kg-dry	1	08-Apr-2014 15:08
Chloroform	U		1.8	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Chloromethane	U		0.92	10	ug/Kg-dry	1	08-Apr-2014 15:08
cis-1,2-Dichloroethene	U		1.5	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
cis-1,3-Dichloropropene	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Cyclohexane	U	n	1.2	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Dibromochloromethane	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Dichlorodifluoromethane	U		1.8	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Dichloromethane	U		1.4	10	ug/Kg-dry	1	08-Apr-2014 15:08
Ethylbenzene	U		0.92	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Isopropylbenzene	U		1.0	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
m,p-Xylene	U		1.7	10	ug/Kg-dry	1	08-Apr-2014 15:08
Methyl acetate	U		1.0	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Methyl tert-butyl ether	U		2.0	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Methylcyclohexane	U		1.5	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
o-Xylene	U		1.0	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Styrene	U		0.62	5.1	ug/Kg-dry	1	08-Apr-2014 15:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB03  
 Collection Date: 01-Apr-2014 10:40

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-05  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method:SW8260</b>				Analyst: WLR	
Tetrachloroethene	U		1.0	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Toluene	U		0.72	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
trans-1,2-Dichloroethene	U		0.92	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
trans-1,3-Dichloropropene	U		0.51	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Trichloroethene	U		1.6	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Trichlorofluoromethane	U		0.82	5.1	ug/Kg-dry	1	08-Apr-2014 15:08
Vinyl chloride	U		1.0	2.1	ug/Kg-dry	1	08-Apr-2014 15:08
Xylenes, Total	U		2.7	15	ug/Kg-dry	1	08-Apr-2014 15:08
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>96.9</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 15:08</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>100</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 15:08</i>
<i>Surr: Dibromofluoromethane</i>	<i>99.5</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 15:08</i>
<i>Surr: Toluene-d8</i>	<i>100</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 15:08</i>

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Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB03  
 Collection Date: 01-Apr-2014 10:40

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		43	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,4,5-Trichlorophenol	U		22	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,4,6-Trichlorophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,4-Dichlorophenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,4-Dimethylphenol	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,4-Dinitrophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,4-Dinitrotoluene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:37
2-Chloronaphthalene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
2-Chlorophenol	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:37
2-Methylnaphthalene	U		28	170	ug/Kg-dry	1	08-Apr-2014 19:37
2-Methylphenol	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
2-Nitroaniline	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:37
2-Nitrophenol	U		19	170	ug/Kg-dry	1	08-Apr-2014 19:37
3&4-Methylphenol	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
3,3'-Dichlorobenzidine	U		20	170	ug/Kg-dry	1	08-Apr-2014 19:37
3-Nitroaniline	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
4,6-Dinitro-2-methylphenol	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:37
4-Bromophenyl phenyl ether	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
4-Chloro-3-methylphenol	U		35	170	ug/Kg-dry	1	08-Apr-2014 19:37
4-Chloroaniline	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
4-Chlorophenyl phenyl ether	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:37
4-Nitroaniline	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
4-Nitrophenol	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:37
Acenaphthene	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
Acenaphthylene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Acetophenone	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Anthracene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Atrazine	U		42	170	ug/Kg-dry	1	08-Apr-2014 19:37
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:37
Benzaldehyde	U	n	42	170	ug/Kg-dry	1	08-Apr-2014 19:37
Benzo(a)pyrene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Benzo(b)fluoranthene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Benzo(g,h,i)perylene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Benzo(k)fluoranthene	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
Bis(2-chloroethoxy)methane	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Bis(2-chloroethyl)ether	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
Bis(2-chloroisopropyl)ether	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Bis(2-ethylhexyl)phthalate	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
Butyl benzyl phthalate	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Caprolactam	U		53	170	ug/Kg-dry	1	08-Apr-2014 19:37
Carbazole	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37

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Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB03  
 Collection Date: 01-Apr-2014 10:40

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		18	170	ug/Kg-dry	1	08-Apr-2014 19:37
Dibenz(a,h)anthracene	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
Dibenzofuran	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
Diethyl phthalate	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Dimethyl phthalate	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
Di-n-butyl phthalate	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Di-n-octyl phthalate	U		20	170	ug/Kg-dry	1	08-Apr-2014 19:37
Fluoranthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
Fluorene	U		18	170	ug/Kg-dry	1	08-Apr-2014 19:37
Hexachlorobenzene	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:37
Hexachlorobutadiene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
Hexachlorocyclopentadiene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
Hexachloroethane	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Indeno(1,2,3-cd)pyrene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
Isophorone	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Naphthalene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:37
Nitrobenzene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
N-Nitrosodi-n-propylamine	U		18	170	ug/Kg-dry	1	08-Apr-2014 19:37
N-Nitrosodiphenylamine	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:37
Pentachlorophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Phenanthrene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:37
Phenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:37
Pyrene	U		45	170	ug/Kg-dry	1	08-Apr-2014 19:37
<i>Surr: 2,4,6-Tribromophenol</i>	77.2			36-126	%REC	1	08-Apr-2014 19:37
<i>Surr: 2-Fluorobiphenyl</i>	53.7			43-125	%REC	1	08-Apr-2014 19:37
<i>Surr: 2-Fluorophenol</i>	44.0			37-125	%REC	1	08-Apr-2014 19:37
<i>Surr: 4-Terphenyl-d14</i>	63.7			32-125	%REC	1	08-Apr-2014 19:37
<i>Surr: Nitrobenzene-d5</i>	53.6			37-125	%REC	1	08-Apr-2014 19:37
<i>Surr: Phenol-d6</i>	51.8			40-125	%REC	1	08-Apr-2014 19:37
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.5	3.4	ug/Kg-dry	1	17-Apr-2014 01:48
2,4,5-TP (Silvex)	U		1.8	3.4	ug/Kg-dry	1	17-Apr-2014 01:48
2,4-D	U		0.73	6.9	ug/Kg-dry	1	17-Apr-2014 01:48
2,4-DB	U		0.94	6.9	ug/Kg-dry	1	17-Apr-2014 01:48
Dalapon	U		1.3	3.4	ug/Kg-dry	1	17-Apr-2014 01:48
Dicamba	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 01:48
Dichlorprop	U		1.7	6.9	ug/Kg-dry	1	17-Apr-2014 01:48
Dinoseb	U		1.5	3.4	ug/Kg-dry	1	17-Apr-2014 01:48
MCPA	U		100	690	ug/Kg-dry	1	17-Apr-2014 01:48
MCPP	U		170	690	ug/Kg-dry	1	17-Apr-2014 01:48
<i>Surr: DCAA</i>	31.3			30-150	%REC	1	17-Apr-2014 01:48

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB03  
 Collection Date: 01-Apr-2014 10:40

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-05  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.52	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
4,4'-DDE	U		0.52	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
4,4'-DDT	U		0.52	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
Aldrin	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
alpha-BHC	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
beta-BHC	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
Chlordane	U		2.1	17	ug/Kg-dry	1	17-Apr-2014 22:23
delta-BHC	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
Dieldrin	U		0.52	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
Endosulfan I	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
Endosulfan II	U		0.63	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
Endosulfan sulfate	U		0.63	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
Endrin	U		0.63	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
Endrin aldehyde	U		0.63	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
Endrin ketone	U		0.63	3.5	ug/Kg-dry	1	17-Apr-2014 22:23
gamma-BHC	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
Heptachlor	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
Heptachlor epoxide	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
Methoxychlor	U		3.6	17	ug/Kg-dry	1	17-Apr-2014 22:23
Toxaphene	U		5.0	17	ug/Kg-dry	1	17-Apr-2014 22:23
Surr: Decachlorobiphenyl	99.0			59-144	%REC	1	17-Apr-2014 22:23
Surr: Tetrachloro-m-xylene	92.2			56.9-130	%REC	1	17-Apr-2014 22:23
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
gamma-Chlordane	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 22:23
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>		Prep:SW3546/3665A / 10-Apr-2014		Analyst: JIJ	
Aroclor 1016	U		4.4	17	ug/Kg-dry	1	15-Apr-2014 08:35
Aroclor 1221	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:35
Aroclor 1232	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:35
Aroclor 1242	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:35
Aroclor 1248	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:35
Aroclor 1254	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:35
Aroclor 1260	U		2.5	17	ug/Kg-dry	1	15-Apr-2014 08:35
Surr: Decachlorobiphenyl	99.8			54-143	%REC	1	15-Apr-2014 08:35
Surr: Tetrachloro-m-xylene	66.0			55-137	%REC	1	15-Apr-2014 08:35

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB03  
 Collection Date: 01-Apr-2014 10:40

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-05  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 09-Apr-2014		Analyst: ALR	
Arsenic	1.72		0.104	0.519	mg/Kg-dry	1	10-Apr-2014 02:55
Barium	53.3		0.0830	0.519	mg/Kg-dry	1	10-Apr-2014 02:55
Cadmium	0.264	J	0.0519	0.519	mg/Kg-dry	1	10-Apr-2014 02:55
Chromium	8.08		0.0934	0.519	mg/Kg-dry	1	10-Apr-2014 02:55
Lead	29.7		0.0519	0.519	mg/Kg-dry	1	10-Apr-2014 17:13
Selenium	0.233	J	0.187	0.519	mg/Kg-dry	1	10-Apr-2014 02:55
Silver	0.132	J	0.0830	0.519	mg/Kg-dry	1	10-Apr-2014 17:13
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	11-Apr-2014 09:18
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 09-Apr-2014		Analyst: OFO	
Mercury	1.86	J	0.504	3.57	ug/Kg-dry	1	09-Apr-2014 15:12
<b>TEXAS TPH - TX1005</b>		<b>Method:TX1005</b>		Prep:TX1005PR / 04-Apr-2014		Analyst: RPM	
nC6 to nC12	U		21	100	mg/Kg-dry	1	07-Apr-2014 22:08
>nC12 to nC28	U		21	100	mg/Kg-dry	1	07-Apr-2014 22:08
>nC28 to nC35	U		21	100	mg/Kg-dry	1	07-Apr-2014 22:08
Total Petroleum Hydrocarbon	U		21	100	mg/Kg-dry	1	07-Apr-2014 22:08
Surr: 2-Fluorobiphenyl	74.6			70-130	%REC	1	07-Apr-2014 22:08
Surr: Trifluoromethyl benzene	75.8			70-130	%REC	1	07-Apr-2014 22:08
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	4.59		0.0100	0.0100	wt%	1	07-Apr-2014 12:09
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	9.02	H	0.100	0.100	pH Units	1	11-Apr-2014 15:53
Temp Deg C @pH	23.5	H	0	0	pH Units	1	11-Apr-2014 15:53
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	09-Apr-2014 00:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	09-Apr-2014 13:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SS-04



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS04  
 Collection Date: 31-Mar-2014 12:45

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		2.2	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,1,2,2-Tetrachloroethane	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.7	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,1,2-Trichloroethane	U		2.6	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,1-Dichloroethane	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,1-Dichloroethene	U		1.9	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,2,4-Trichlorobenzene	U		1.2	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,2-Dibromo-3-chloropropane	U		1.7	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,2-Dibromoethane	U		0.90	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,2-Dichlorobenzene	U		1.0	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,2-Dichloroethane	U		0.77	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,2-Dichloropropane	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,3-Dichlorobenzene	U		1.2	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
1,4-Dichlorobenzene	U		0.90	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
2-Butanone	U		2.8	13	ug/Kg-dry	1	07-Apr-2014 16:13
2-Hexanone	U		2.2	13	ug/Kg-dry	1	07-Apr-2014 16:13
4-Methyl-2-pentanone	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 16:13
Acetone	U		5.9	26	ug/Kg-dry	1	07-Apr-2014 16:13
Benzene	U		0.77	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Bromodichloromethane	U		0.77	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Bromoform	U		0.90	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Bromomethane	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 16:13
Carbon disulfide	U		2.0	13	ug/Kg-dry	1	07-Apr-2014 16:13
Carbon tetrachloride	U		1.5	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Chlorobenzene	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Chloroethane	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 16:13
Chloroform	U		2.3	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Chloromethane	U		1.2	13	ug/Kg-dry	1	07-Apr-2014 16:13
cis-1,2-Dichloroethene	U		1.9	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
cis-1,3-Dichloropropene	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Cyclohexane	U	n	1.5	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Dibromochloromethane	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Dichlorodifluoromethane	U		2.3	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
<b>Dichloromethane</b>	<b>16</b>		<b>1.8</b>	<b>13</b>	<b>ug/Kg-dry</b>	1	07-Apr-2014 16:13
Ethylbenzene	U		1.2	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Isopropylbenzene	U		1.3	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
m,p-Xylene	U		2.2	13	ug/Kg-dry	1	07-Apr-2014 16:13
Methyl acetate	U		1.3	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Methyl tert-butyl ether	U		2.4	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Methylcyclohexane	U		1.9	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
o-Xylene	U		1.3	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Styrene	U		0.77	6.4	ug/Kg-dry	1	07-Apr-2014 16:13

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS04  
 Collection Date: 31-Mar-2014 12:45

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
Tetrachloroethene	U		1.3	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
<b>Toluene</b>	<b>3.0</b>	J	<b>0.90</b>	<b>6.4</b>	<b>ug/Kg-dry</b>	1	07-Apr-2014 16:13
trans-1,2-Dichloroethene	U		1.2	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
trans-1,3-Dichloropropene	U		0.64	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Trichloroethene	U		2.0	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Trichlorofluoromethane	U		1.0	6.4	ug/Kg-dry	1	07-Apr-2014 16:13
Vinyl chloride	U		1.3	2.6	ug/Kg-dry	1	07-Apr-2014 16:13
Xylenes, Total	U		3.3	19	ug/Kg-dry	1	07-Apr-2014 16:13
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>87.1</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:13</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>76.7</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:13</i>
<i>Surr: Dibromofluoromethane</i>	<i>93.5</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:13</i>
<i>Surr: Toluene-d8</i>	<i>108</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:13</i>
<b>TEXAS TPH - TX1005</b>			<b>Method: TX1005</b>			Prep: TX1005PR / 02-Apr-2014	
nC6 to nC12	U		23	110	mg/Kg-dry	1	03-Apr-2014 15:30
>nC12 to nC28	U		23	110	mg/Kg-dry	1	03-Apr-2014 15:30
>nC28 to nC35	U		23	110	mg/Kg-dry	1	03-Apr-2014 15:30
Total Petroleum Hydrocarbon	U		23	110	mg/Kg-dry	1	03-Apr-2014 15:30
<i>Surr: 2-Fluorobiphenyl</i>	<i>76.8</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 15:30</i>
<i>Surr: Trifluoromethyl benzene</i>	<i>77.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 15:30</i>
<b>MOISTURE</b>			<b>Method: SW3550</b>			Analyst: KAH	
<b>Percent Moisture</b>	<b>0.715</b>		<b>0.0100</b>	<b>0.0100</b>	<b>wt%</b>	1	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS04  
 Collection Date: 31-Mar-2014 12:45

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-04  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		41	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:15
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
2-Chlorophenol	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:15
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	08-Apr-2014 19:15
2-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
2-Nitroaniline	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:15
2-Nitrophenol	U		18	170	ug/Kg-dry	1	08-Apr-2014 19:15
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	08-Apr-2014 19:15
3-Nitroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:15
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
4-Chloro-3-methylphenol	U		33	170	ug/Kg-dry	1	08-Apr-2014 19:15
4-Chloroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:15
4-Nitroaniline	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
4-Nitrophenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 19:15
Acenaphthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
Acenaphthylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Acetophenone	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Anthracene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Atrazine	U		40	170	ug/Kg-dry	1	08-Apr-2014 19:15
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	08-Apr-2014 19:15
Benzaldehyde	U	n	40	170	ug/Kg-dry	1	08-Apr-2014 19:15
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
<b>Bis(2-ethylhexyl)phthalate</b>	<b>97</b>	<b>J</b>	<b>13</b>	<b>170</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>08-Apr-2014 19:15</b>
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Caprolactam	U		52	170	ug/Kg-dry	1	08-Apr-2014 19:15
Carbazole	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS04  
 Collection Date: 31-Mar-2014 12:45

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-04  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
<b>Chrysene</b>	<b>76</b>	<b>J</b>	<b>17</b>	<b>170</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>08-Apr-2014 19:15</b>
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
Dibenzofuran	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:15
Diethyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	08-Apr-2014 19:15
<b>Fluoranthene</b>	<b>52</b>	<b>J</b>	<b>14</b>	<b>170</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>08-Apr-2014 19:15</b>
Fluorene	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:15
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	08-Apr-2014 19:15
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:15
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:15
Hexachloroethane	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:15
Isophorone	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Naphthalene	U		13	170	ug/Kg-dry	1	08-Apr-2014 19:15
Nitrobenzene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:15
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	08-Apr-2014 19:15
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	08-Apr-2014 19:15
Pentachlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Phenanthrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 19:15
Phenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 19:15
Pyrene	U		43	170	ug/Kg-dry	1	08-Apr-2014 19:15
<i>Surr: 2,4,6-Tribromophenol</i>	55.2			36-126	%REC	1	08-Apr-2014 19:15
<i>Surr: 2-Fluorobiphenyl</i>	50.2			43-125	%REC	1	08-Apr-2014 19:15
<i>Surr: 2-Fluorophenol</i>	38.6			37-125	%REC	1	08-Apr-2014 19:15
<i>Surr: 4-Terphenyl-d14</i>	56.2			32-125	%REC	1	08-Apr-2014 19:15
<i>Surr: Nitrobenzene-d5</i>	45.8			37-125	%REC	1	08-Apr-2014 19:15
<i>Surr: Phenol-d6</i>	41.2			40-125	%REC	1	08-Apr-2014 19:15
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		7.1	17	ug/Kg-dry	5	11-Apr-2014 09:36
2,4,5-TP (Silvex)	U		8.6	17	ug/Kg-dry	5	11-Apr-2014 09:36
2,4-D	U		3.5	33	ug/Kg-dry	5	11-Apr-2014 09:36
2,4-DB	U		4.5	33	ug/Kg-dry	5	11-Apr-2014 09:36
Dalapon	U		6.1	17	ug/Kg-dry	5	11-Apr-2014 09:36
Dicamba	U		6.6	17	ug/Kg-dry	5	11-Apr-2014 09:36
Dichlorprop	U		8.1	33	ug/Kg-dry	5	11-Apr-2014 09:36
Dinoseb	U		7.1	17	ug/Kg-dry	5	11-Apr-2014 09:36
MCPA	U		500	3300	ug/Kg-dry	5	11-Apr-2014 09:36
MCPP	U		810	3300	ug/Kg-dry	5	11-Apr-2014 09:36
<i>Surr: DCAA</i>	47.0			30-150	%REC	5	11-Apr-2014 09:36

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS04  
 Collection Date: 31-Mar-2014 12:45

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-04  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.51	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
<b>4,4'-DDE</b>	<b>3.3</b>	J	<b>0.51</b>	<b>3.3</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 22:07
4,4'-DDT	U		0.51	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
Aldrin	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
<b>alpha-BHC</b>	<b>3.4</b>		<b>0.30</b>	<b>1.7</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 22:07
<b>beta-BHC</b>	<b>7.1</b>	P	<b>0.30</b>	<b>1.7</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 22:07
Chlordane	U		2.0	17	ug/Kg-dry	1	17-Apr-2014 22:07
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
Dieldrin	U		0.51	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
Endosulfan II	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
Endosulfan sulfate	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
Endrin	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
Endrin aldehyde	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
Endrin ketone	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 22:07
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
<b>Heptachlor</b>	<b>5.6</b>		<b>0.30</b>	<b>1.7</b>	<b>ug/Kg-dry</b>	1	17-Apr-2014 22:07
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
Methoxychlor	U		3.4	17	ug/Kg-dry	1	17-Apr-2014 22:07
Toxaphene	U		4.9	17	ug/Kg-dry	1	17-Apr-2014 22:07
<i>Surr: Decachlorobiphenyl</i>	105			59-144	%REC	1	17-Apr-2014 22:07
<i>Surr: Tetrachloro-m-xylene</i>	63.3			56.9-130	%REC	1	17-Apr-2014 22:07
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 22:07
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>		Prep:SW3546/3665A / 10-Apr-2014		Analyst: JLJ	
Aroclor 1016	U		4.3	17	ug/Kg-dry	1	15-Apr-2014 08:20
Aroclor 1221	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:20
Aroclor 1232	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:20
Aroclor 1242	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:20
Aroclor 1248	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:20
Aroclor 1254	U		17	17	ug/Kg-dry	1	15-Apr-2014 08:20
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	15-Apr-2014 08:20
<i>Surr: Decachlorobiphenyl</i>	97.5			54-143	%REC	1	15-Apr-2014 08:20
<i>Surr: Tetrachloro-m-xylene</i>	57.2			55-137	%REC	1	15-Apr-2014 08:20

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS04  
 Collection Date: 31-Mar-2014 12:45

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-04  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 09-Apr-2014		Analyst: ALR	
Arsenic	3.41		0.0949	0.475	mg/Kg-dry	1	10-Apr-2014 02:51
Barium	99.7		0.0760	0.475	mg/Kg-dry	1	10-Apr-2014 02:51
Cadmium	3.09		0.0475	0.475	mg/Kg-dry	1	10-Apr-2014 02:51
Chromium	18.7		0.0855	0.475	mg/Kg-dry	1	10-Apr-2014 02:51
Lead	134		0.0475	0.475	mg/Kg-dry	1	10-Apr-2014 17:08
Selenium	0.288	J	0.171	0.475	mg/Kg-dry	1	10-Apr-2014 02:51
Silver	0.0830	J	0.0760	0.475	mg/Kg-dry	1	10-Apr-2014 17:08
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	11-Apr-2014 09:18
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 09-Apr-2014		Analyst: OFO	
Mercury	14.1		0.510	3.61	ug/Kg-dry	1	09-Apr-2014 15:10
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	1.27		0.0100	0.0100	wt%	1	07-Apr-2014 12:09
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	7.37	H	0.100	0.100	pH Units	1	11-Apr-2014 15:53
Temp Deg C @pH	23.6	H	0	0	pH Units	1	11-Apr-2014 15:53
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	09-Apr-2014 00:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	09-Apr-2014 13:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SB-04



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB04  
 Collection Date: 31-Mar-2014 13:15

**ANALYTICAL REPORT**  
 WorkOrder: HS14040053  
 Lab ID: HS14040053-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		2.4	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,1,2,2-Tetrachloroethane	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.8	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,1,2-Trichloroethane	U		2.8	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,1-Dichloroethane	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,1-Dichloroethene	U		2.1	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,2,4-Trichlorobenzene	U		1.3	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,2-Dibromo-3-chloropropane	U		1.8	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,2-Dibromoethane	U		0.99	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,2-Dichlorobenzene	U		1.1	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,2-Dichloroethane	U		0.85	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,2-Dichloropropane	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,3-Dichlorobenzene	U		1.3	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
1,4-Dichlorobenzene	U		0.99	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
2-Butanone	U		3.1	14	ug/Kg-dry	1	07-Apr-2014 17:23
2-Hexanone	U		2.4	14	ug/Kg-dry	1	07-Apr-2014 17:23
4-Methyl-2-pentanone	U		1.4	14	ug/Kg-dry	1	07-Apr-2014 17:23
Acetone	U		6.5	28	ug/Kg-dry	1	07-Apr-2014 17:23
Benzene	U		0.85	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Bromodichloromethane	U		0.85	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Bromoform	U		0.99	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Bromomethane	U		1.4	14	ug/Kg-dry	1	07-Apr-2014 17:23
Carbon disulfide	U		2.3	14	ug/Kg-dry	1	07-Apr-2014 17:23
Carbon tetrachloride	U		1.7	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Chlorobenzene	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Chloroethane	U		1.4	14	ug/Kg-dry	1	07-Apr-2014 17:23
Chloroform	U		2.6	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Chloromethane	U		1.3	14	ug/Kg-dry	1	07-Apr-2014 17:23
cis-1,2-Dichloroethene	U		2.1	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
cis-1,3-Dichloropropene	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Cyclohexane	U	n	1.7	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Dibromochloromethane	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Dichlorodifluoromethane	U		2.6	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
<b>Dichloromethane</b>	<b>14</b>		<b>2.0</b>	<b>14</b>	<b>ug/Kg-dry</b>	1	07-Apr-2014 17:23
Ethylbenzene	U		1.3	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Isopropylbenzene	U		1.4	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
m,p-Xylene	U		2.4	14	ug/Kg-dry	1	07-Apr-2014 17:23
Methyl acetate	U		1.4	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Methyl tert-butyl ether	U		2.7	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Methylcyclohexane	U		2.1	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
o-Xylene	U		1.4	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Styrene	U		0.85	7.1	ug/Kg-dry	1	07-Apr-2014 17:23

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB04  
 Collection Date: 31-Mar-2014 13:15

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
Tetrachloroethene	U		1.4	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
<b>Toluene</b>	<b>1.8</b>	<b>J</b>	<b>0.99</b>	<b>7.1</b>	<b>ug/Kg-dry</b>	<b>1</b>	07-Apr-2014 17:23
trans-1,2-Dichloroethene	U		1.3	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
trans-1,3-Dichloropropene	U		0.71	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Trichloroethene	U		2.3	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Trichlorofluoromethane	U		1.1	7.1	ug/Kg-dry	1	07-Apr-2014 17:23
Vinyl chloride	U		1.4	2.8	ug/Kg-dry	1	07-Apr-2014 17:23
Xylenes, Total	U		3.7	21	ug/Kg-dry	1	07-Apr-2014 17:23
<i>Surr: 1,2-Dichloroethane-d4</i>	78.5			70-128	%REC	1	07-Apr-2014 17:23
<i>Surr: 4-Bromofluorobenzene</i>	72.5	<b>S</b>		73-126	%REC	1	07-Apr-2014 17:23
<i>Surr: Dibromofluoromethane</i>	89.9			71-128	%REC	1	07-Apr-2014 17:23
<i>Surr: Toluene-d8</i>	111			73-127	%REC	1	07-Apr-2014 17:23
<b>TEXAS TPH - TX1005</b>			<b>Method: TX1005</b>			Prep: TX1005PR / 02-Apr-2014	
nC6 to nC12	U		28	140	mg/Kg-dry	1	03-Apr-2014 11:12
>nC12 to nC28	U		28	140	mg/Kg-dry	1	03-Apr-2014 11:12
>nC28 to nC35	U		28	140	mg/Kg-dry	1	03-Apr-2014 11:12
Total Petroleum Hydrocarbon	U		28	140	mg/Kg-dry	1	03-Apr-2014 11:12
<i>Surr: 2-Fluorobiphenyl</i>	76.9			70-130	%REC	1	03-Apr-2014 11:12
<i>Surr: Trifluoromethyl benzene</i>	84.3			70-130	%REC	1	03-Apr-2014 11:12
<b>MOISTURE</b>			<b>Method: SW3550</b>			Analyst: KAH	
<b>Percent Moisture</b>	<b>2.84</b>		<b>0.0100</b>	<b>0.0100</b>	<b>wt%</b>	<b>1</b>	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB04  
 Collection Date: 31-Mar-2014 13:15

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		42	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	07-Apr-2014 17:19
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
2-Chlorophenol	U		10	170	ug/Kg-dry	1	07-Apr-2014 17:19
2-Methylnaphthalene	U		28	170	ug/Kg-dry	1	07-Apr-2014 17:19
2-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
2-Nitroaniline	U		16	170	ug/Kg-dry	1	07-Apr-2014 17:19
2-Nitrophenol	U		18	170	ug/Kg-dry	1	07-Apr-2014 17:19
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	07-Apr-2014 17:19
3-Nitroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 17:19
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
4-Chloro-3-methylphenol	U		34	170	ug/Kg-dry	1	07-Apr-2014 17:19
4-Chloroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	07-Apr-2014 17:19
4-Nitroaniline	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
4-Nitrophenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 17:19
Acenaphthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
Acenaphthylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Acetophenone	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Anthracene	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Atrazine	U		41	170	ug/Kg-dry	1	07-Apr-2014 17:19
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	07-Apr-2014 17:19
Benzaldehyde	U	n	41	170	ug/Kg-dry	1	07-Apr-2014 17:19
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
<b>Bis(2-ethylhexyl)phthalate</b>	<b>180</b>		<b>13</b>	<b>170</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>07-Apr-2014 17:19</b>
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Caprolactam	U		52	170	ug/Kg-dry	1	07-Apr-2014 17:19
Carbazole	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB04  
 Collection Date: 31-Mar-2014 13:15

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-05  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	07-Apr-2014 17:19
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
Dibenzofuran	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
Diethyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	07-Apr-2014 17:19
Fluoranthene	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
Fluorene	U		17	170	ug/Kg-dry	1	07-Apr-2014 17:19
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	07-Apr-2014 17:19
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
Hexachloroethane	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
Isophorone	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Naphthalene	U		13	170	ug/Kg-dry	1	07-Apr-2014 17:19
Nitrobenzene	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	07-Apr-2014 17:19
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	07-Apr-2014 17:19
Pentachlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Phenanthrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 17:19
Phenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 17:19
Pyrene	U		44	170	ug/Kg-dry	1	07-Apr-2014 17:19
<i>Surr: 2,4,6-Tribromophenol</i>	75.9			36-126	%REC	1	07-Apr-2014 17:19
<i>Surr: 2-Fluorobiphenyl</i>	61.9			43-125	%REC	1	07-Apr-2014 17:19
<i>Surr: 2-Fluorophenol</i>	40.3			37-125	%REC	1	07-Apr-2014 17:19
<i>Surr: 4-Terphenyl-d14</i>	66.7			32-125	%REC	1	07-Apr-2014 17:19
<i>Surr: Nitrobenzene-d5</i>	54.1			37-125	%REC	1	07-Apr-2014 17:19
<i>Surr: Phenol-d6</i>	43.7			40-125	%REC	1	07-Apr-2014 17:19
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 03:01
2,4,5-TP (Silvex)	U		1.7	3.4	ug/Kg-dry	1	17-Apr-2014 03:01
2,4-D	U		0.72	6.8	ug/Kg-dry	1	17-Apr-2014 03:01
2,4-DB	U		0.92	6.8	ug/Kg-dry	1	17-Apr-2014 03:01
Dalapon	U		1.2	3.4	ug/Kg-dry	1	17-Apr-2014 03:01
Dicamba	U		1.3	3.4	ug/Kg-dry	1	17-Apr-2014 03:01
<b>Dichloroprop</b>	<b>76</b>	<b>P</b>	<b>1.6</b>	<b>6.8</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 03:01</b>
Dinoseb	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 03:01
MCPA	U		100	680	ug/Kg-dry	1	17-Apr-2014 03:01
MCPP	U		160	680	ug/Kg-dry	1	17-Apr-2014 03:01
<i>Surr: DCAA</i>	65.8			30-150	%REC	1	17-Apr-2014 03:01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB04  
 Collection Date: 31-Mar-2014 13:15

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-05  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.51	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
<b>4,4'-DDE</b>	<b>7.3</b>		<b>0.51</b>	<b>3.4</b>	<b>ug/Kg-dry</b>	1	10-Apr-2014 04:23
4,4'-DDT	U		0.51	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
Aldrin	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
alpha-BHC	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
beta-BHC	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
Chlordane	U		2.0	17	ug/Kg-dry	1	10-Apr-2014 04:23
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
Dieldrin	U		0.51	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
Endosulfan I	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
Endosulfan II	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
Endosulfan sulfate	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
Endrin	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
Endrin aldehyde	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
Endrin ketone	U		0.61	3.4	ug/Kg-dry	1	10-Apr-2014 04:23
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
Heptachlor	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
Heptachlor epoxide	U		0.31	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
Methoxychlor	U		3.5	17	ug/Kg-dry	1	10-Apr-2014 04:23
Toxaphene	U		4.9	17	ug/Kg-dry	1	10-Apr-2014 04:23
<i>Surr: Decachlorobiphenyl</i>	<i>85.1</i>			<i>59-144</i>	<i>%REC</i>	<i>1</i>	<i>10-Apr-2014 04:23</i>
<i>Surr: Tetrachloro-m-xylene</i>	<i>73.9</i>			<i>56.9-130</i>	<i>%REC</i>	<i>1</i>	<i>10-Apr-2014 04:23</i>
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 04:23
<b>gamma-Chlordane</b>	<b>1.3</b>	<b>JP</b>	<b>0.20</b>	<b>1.7</b>	<b>ug/Kg-dry</b>	1	10-Apr-2014 04:23
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>				Analyst: SE	
Aroclor 1016	U		4.3	17	ug/Kg-dry	1	08-Apr-2014 02:16
Aroclor 1221	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:16
Aroclor 1232	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:16
Aroclor 1242	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:16
Aroclor 1248	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:16
Aroclor 1254	U		17	17	ug/Kg-dry	1	08-Apr-2014 02:16
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	08-Apr-2014 02:16
<i>Surr: Decachlorobiphenyl</i>	<i>109</i>			<i>54-143</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 02:16</i>
<i>Surr: Tetrachloro-m-xylene</i>	<i>90.6</i>			<i>55-137</i>	<i>%REC</i>	<i>1</i>	<i>08-Apr-2014 02:16</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB04  
 Collection Date: 31-Mar-2014 13:15

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-05  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 08-Apr-2014		Analyst: ALR	
Arsenic	2.73		0.0987	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
Barium	140		0.0789	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
Cadmium	3.87		0.0493	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
Chromium	12.0		0.0888	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
Lead	145		0.0493	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
Selenium	0.268	J	0.178	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
Silver	0.118	J	0.0789	0.493	mg/Kg-dry	1	08-Apr-2014 15:23
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	08-Apr-2014 17:33
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 08-Apr-2014		Analyst: OFO	
Mercury	18.7		0.502	3.55	ug/Kg-dry	1	08-Apr-2014 14:24
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	2.63		0.0100	0.0100	wt%	1	03-Apr-2014 15:50
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	7.88	H	0.100	0.100	pH Units	1	08-Apr-2014 17:26
Temp Deg C @pH	22.1	H	0	0	pH Units	1	08-Apr-2014 17:26
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	07-Apr-2014 10:30
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	07-Apr-2014 11:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SS-05



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS05  
 Collection Date: 31-Mar-2014 13:30

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-03  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		1.8	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,1,2,2-Tetrachloroethane	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.4	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,1,2-Trichloroethane	U		2.1	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,1-Dichloroethane	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,1-Dichloroethene	U		1.6	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,2,4-Trichlorobenzene	U		0.95	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,2-Dibromo-3-chloropropane	U		1.4	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,2-Dibromoethane	U		0.74	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,2-Dichlorobenzene	U		0.84	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,2-Dichloroethane	U		0.63	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,2-Dichloropropane	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,3-Dichlorobenzene	U		0.95	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
1,4-Dichlorobenzene	U		0.74	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
2-Butanone	U		2.3	11	ug/Kg-dry	1	07-Apr-2014 16:36
2-Hexanone	U		1.8	11	ug/Kg-dry	1	07-Apr-2014 16:36
4-Methyl-2-pentanone	U		1.1	11	ug/Kg-dry	1	07-Apr-2014 16:36
Acetone	U		4.9	21	ug/Kg-dry	1	07-Apr-2014 16:36
Benzene	U		0.63	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Bromodichloromethane	U		0.63	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Bromoform	U		0.74	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Bromomethane	U		1.1	11	ug/Kg-dry	1	07-Apr-2014 16:36
Carbon disulfide	U		1.7	11	ug/Kg-dry	1	07-Apr-2014 16:36
Carbon tetrachloride	U		1.3	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Chlorobenzene	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Chloroethane	U		1.1	11	ug/Kg-dry	1	07-Apr-2014 16:36
Chloroform	U		1.9	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Chloromethane	U		0.95	11	ug/Kg-dry	1	07-Apr-2014 16:36
cis-1,2-Dichloroethene	U		1.6	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
cis-1,3-Dichloropropene	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Cyclohexane	U	n	1.3	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Dibromochloromethane	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Dichlorodifluoromethane	U		1.9	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Dichloromethane	U		1.5	11	ug/Kg-dry	1	07-Apr-2014 16:36
Ethylbenzene	U		0.95	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Isopropylbenzene	U		1.1	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
m,p-Xylene	U		1.8	11	ug/Kg-dry	1	07-Apr-2014 16:36
Methyl acetate	U		1.1	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Methyl tert-butyl ether	U		2.0	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Methylcyclohexane	U		1.6	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
o-Xylene	U		1.1	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Styrene	U		0.63	5.3	ug/Kg-dry	1	07-Apr-2014 16:36

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS05  
 Collection Date: 31-Mar-2014 13:30

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-03  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
Tetrachloroethene	U		1.1	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
<b>Toluene</b>	<b>1.3</b>	<b>J</b>	<b>0.74</b>	<b>5.3</b>	<b>ug/Kg-dry</b>	<b>1</b>	07-Apr-2014 16:36
trans-1,2-Dichloroethene	U		0.95	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
trans-1,3-Dichloropropene	U		0.53	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Trichloroethene	U		1.7	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Trichlorofluoromethane	U		0.84	5.3	ug/Kg-dry	1	07-Apr-2014 16:36
Vinyl chloride	U		1.1	2.1	ug/Kg-dry	1	07-Apr-2014 16:36
Xylenes, Total	U		2.7	16	ug/Kg-dry	1	07-Apr-2014 16:36
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>77.3</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:36</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>83.4</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:36</i>
<i>Surr: Dibromofluoromethane</i>	<i>86.6</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:36</i>
<i>Surr: Toluene-d8</i>	<i>96.3</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>07-Apr-2014 16:36</i>
<b>TEXAS TPH - TX1005</b>			<b>Method: TX1005</b>			Prep: TX1005PR / 02-Apr-2014	
nC6 to nC12	U		20	100	mg/Kg-dry	1	03-Apr-2014 10:13
>nC12 to nC28	U		20	100	mg/Kg-dry	1	03-Apr-2014 10:13
>nC28 to nC35	U		20	100	mg/Kg-dry	1	03-Apr-2014 10:13
Total Petroleum Hydrocarbon	U		20	100	mg/Kg-dry	1	03-Apr-2014 10:13
<i>Surr: 2-Fluorobiphenyl</i>	<i>79.7</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 10:13</i>
<i>Surr: Trifluoromethyl benzene</i>	<i>88.3</i>			<i>70-130</i>	<i>%REC</i>	<i>1</i>	<i>03-Apr-2014 10:13</i>
<b>MOISTURE</b>			<b>Method: SW3550</b>			Analyst: KAH	
<b>Percent Moisture</b>	<b>0.528</b>		<b>0.0100</b>	<b>0.0100</b>	<b>wt%</b>	<b>1</b>	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS05  
 Collection Date: 31-Mar-2014 13:30

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		41	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	08-Apr-2014 18:33
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
2-Chlorophenol	U		10	170	ug/Kg-dry	1	08-Apr-2014 18:33
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	08-Apr-2014 18:33
2-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
2-Nitroaniline	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:33
2-Nitrophenol	U		18	170	ug/Kg-dry	1	08-Apr-2014 18:33
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	08-Apr-2014 18:33
3-Nitroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:33
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
4-Chloro-3-methylphenol	U		33	170	ug/Kg-dry	1	08-Apr-2014 18:33
4-Chloroaniline	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:33
4-Nitroaniline	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
4-Nitrophenol	U		16	170	ug/Kg-dry	1	08-Apr-2014 18:33
Acenaphthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
Acenaphthylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Acetophenone	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Anthracene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Atrazine	U		40	170	ug/Kg-dry	1	08-Apr-2014 18:33
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	08-Apr-2014 18:33
Benzaldehyde	U	n	40	170	ug/Kg-dry	1	08-Apr-2014 18:33
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Caprolactam	U		51	170	ug/Kg-dry	1	08-Apr-2014 18:33
Carbazole	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS05  
 Collection Date: 31-Mar-2014 13:30

**ANALYTICAL REPORT**

WorkOrder: HS14040157  
 Lab ID: HS14040157-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	08-Apr-2014 18:33
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
Dibenzofuran	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
Diethyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	08-Apr-2014 18:33
Fluoranthene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
Fluorene	U		17	170	ug/Kg-dry	1	08-Apr-2014 18:33
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	08-Apr-2014 18:33
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
Hexachloroethane	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
Isophorone	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Naphthalene	U		13	170	ug/Kg-dry	1	08-Apr-2014 18:33
Nitrobenzene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	08-Apr-2014 18:33
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	08-Apr-2014 18:33
Pentachlorophenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Phenanthrene	U		14	170	ug/Kg-dry	1	08-Apr-2014 18:33
Phenol	U		11	170	ug/Kg-dry	1	08-Apr-2014 18:33
Pyrene	U		43	170	ug/Kg-dry	1	08-Apr-2014 18:33
Surr: 2,4,6-Tribromophenol	76.8			36-126	%REC	1	08-Apr-2014 18:33
Surr: 2-Fluorobiphenyl	63.5			43-125	%REC	1	08-Apr-2014 18:33
Surr: 2-Fluorophenol	57.8			37-125	%REC	1	08-Apr-2014 18:33
Surr: 4-Terphenyl-d14	77.2			32-125	%REC	1	08-Apr-2014 18:33
Surr: Nitrobenzene-d5	67.1			37-125	%REC	1	08-Apr-2014 18:33
Surr: Phenol-d6	61.4			40-125	%REC	1	08-Apr-2014 18:33
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.3	ug/Kg-dry	1	17-Apr-2014 01:11
2,4,5-TP (Silvex)	U		1.7	3.3	ug/Kg-dry	1	17-Apr-2014 01:11
2,4-D	U		0.70	6.6	ug/Kg-dry	1	17-Apr-2014 01:11
2,4-DB	U		0.90	6.6	ug/Kg-dry	1	17-Apr-2014 01:11
Dalapon	U		1.2	3.3	ug/Kg-dry	1	17-Apr-2014 01:11
Dicamba	U		1.3	3.3	ug/Kg-dry	1	17-Apr-2014 01:11
Dichlorprop	U		1.6	6.6	ug/Kg-dry	1	17-Apr-2014 01:11
Dinoseb	U		1.4	3.3	ug/Kg-dry	1	17-Apr-2014 01:11
MCPA	U		100	660	ug/Kg-dry	1	17-Apr-2014 01:11
MCPP	U		160	660	ug/Kg-dry	1	17-Apr-2014 01:11
Surr: DCAA	52.0			30-150	%REC	1	17-Apr-2014 01:11

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS05  
 Collection Date: 31-Mar-2014 13:30

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
4,4'-DDE	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
4,4'-DDT	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
Aldrin	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
alpha-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
beta-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
Chlordane	U		2.0	17	ug/Kg-dry	1	17-Apr-2014 21:01
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
Dieldrin	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
Endosulfan II	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
Endosulfan sulfate	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
Endrin	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
Endrin aldehyde	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
Endrin ketone	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 21:01
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
Heptachlor	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
Methoxychlor	U		3.4	17	ug/Kg-dry	1	17-Apr-2014 21:01
Toxaphene	U		4.8	17	ug/Kg-dry	1	17-Apr-2014 21:01
Surr: Decachlorobiphenyl	98.3			59-144	%REC	1	17-Apr-2014 21:01
Surr: Tetrachloro-m-xylene	99.6			56.9-130	%REC	1	17-Apr-2014 21:01
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 10-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 21:01
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>		Prep:SW3546/3665A / 10-Apr-2014		Analyst: JLJ	
Aroclor 1016	U		4.2	17	ug/Kg-dry	1	15-Apr-2014 07:50
Aroclor 1221	U		17	17	ug/Kg-dry	1	15-Apr-2014 07:50
Aroclor 1232	U		17	17	ug/Kg-dry	1	15-Apr-2014 07:50
Aroclor 1242	U		17	17	ug/Kg-dry	1	15-Apr-2014 07:50
Aroclor 1248	U		17	17	ug/Kg-dry	1	15-Apr-2014 07:50
Aroclor 1254	U		17	17	ug/Kg-dry	1	15-Apr-2014 07:50
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	15-Apr-2014 07:50
Surr: Decachlorobiphenyl	112			54-143	%REC	1	15-Apr-2014 07:50
Surr: Tetrachloro-m-xylene	83.1			55-137	%REC	1	15-Apr-2014 07:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS05  
 Collection Date: 31-Mar-2014 13:30

**ANALYTICAL REPORT**

WorkOrder:HS14040157  
 Lab ID:HS14040157-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 09-Apr-2014		Analyst: ALR	
Arsenic	1.30		0.0951	0.475	mg/Kg-dry	1	10-Apr-2014 02:41
Barium	26.2		0.0761	0.475	mg/Kg-dry	1	10-Apr-2014 02:41
Cadmium	0.0481	J	0.0475	0.475	mg/Kg-dry	1	10-Apr-2014 02:41
Chromium	4.00		0.0856	0.475	mg/Kg-dry	1	10-Apr-2014 02:41
Lead	4.25		0.0475	0.475	mg/Kg-dry	1	10-Apr-2014 16:58
Selenium	0.325	J	0.171	0.475	mg/Kg-dry	1	10-Apr-2014 02:41
Silver	U		0.0761	0.475	mg/Kg-dry	1	10-Apr-2014 16:58
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	11-Apr-2014 09:18
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 09-Apr-2014		Analyst: OFO	
Mercury	U		0.495	3.50	ug/Kg-dry	1	09-Apr-2014 15:06
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	0.835		0.0100	0.0100	wt%	1	07-Apr-2014 12:09
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	8.12	H	0.100	0.100	pH Units	1	11-Apr-2014 15:53
Temp Deg C @pH	23.6	H	0	0	pH Units	1	11-Apr-2014 15:53
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	09-Apr-2014 00:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	09-Apr-2014 13:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SB-05



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB05  
 Collection Date: 31-Mar-2014 13:55

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		2.3	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,1,2,2-Tetrachloroethane	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,1,2-Trichloro-1,2,2-trifluoroethane	U		1.7	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,1,2-Trichloroethane	U		2.7	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,1-Dichloroethane	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,1-Dichloroethene	U		2.0	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,2,4-Trichlorobenzene	U		1.2	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,2-Dibromo-3-chloropropane	U		1.7	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,2-Dibromoethane	U		0.94	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,2-Dichlorobenzene	U		1.1	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,2-Dichloroethane	U		0.80	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,2-Dichloropropane	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,3-Dichlorobenzene	U		1.2	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
1,4-Dichlorobenzene	U		0.94	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
2-Butanone	U		2.9	13	ug/Kg-dry	1	07-Apr-2014 15:49
2-Hexanone	U		2.3	13	ug/Kg-dry	1	07-Apr-2014 15:49
4-Methyl-2-pentanone	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 15:49
Acetone	U		6.2	27	ug/Kg-dry	1	07-Apr-2014 15:49
Benzene	U		0.80	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Bromodichloromethane	U		0.80	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Bromoform	U		0.94	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Bromomethane	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 15:49
Carbon disulfide	U		2.1	13	ug/Kg-dry	1	07-Apr-2014 15:49
Carbon tetrachloride	U		1.6	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Chlorobenzene	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Chloroethane	U		1.3	13	ug/Kg-dry	1	07-Apr-2014 15:49
Chloroform	U		2.4	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Chloromethane	U		1.2	13	ug/Kg-dry	1	07-Apr-2014 15:49
cis-1,2-Dichloroethene	U		2.0	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
cis-1,3-Dichloropropene	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Cyclohexane	U	n	1.6	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Dibromochloromethane	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Dichlorodifluoromethane	U		2.4	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Dichloromethane	U		1.9	13	ug/Kg-dry	1	07-Apr-2014 15:49
Ethylbenzene	U		1.2	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Isopropylbenzene	U		1.3	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
m,p-Xylene	U		2.3	13	ug/Kg-dry	1	07-Apr-2014 15:49
Methyl acetate	U		1.3	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Methyl tert-butyl ether	U		2.5	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Methylcyclohexane	U		2.0	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
o-Xylene	U		1.3	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Styrene	U		0.80	6.7	ug/Kg-dry	1	07-Apr-2014 15:49

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB05  
 Collection Date: 31-Mar-2014 13:55

**ANALYTICAL REPORT**

WorkOrder: HS14040053  
 Lab ID: HS14040053-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
Tetrachloroethene	U		1.3	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Toluene	U		0.94	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
trans-1,2-Dichloroethene	U		1.2	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
trans-1,3-Dichloropropene	U		0.67	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Trichloroethene	U		2.1	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Trichlorofluoromethane	U		1.1	6.7	ug/Kg-dry	1	07-Apr-2014 15:49
Vinyl chloride	U		1.3	2.7	ug/Kg-dry	1	07-Apr-2014 15:49
Xylenes, Total	U		3.5	20	ug/Kg-dry	1	07-Apr-2014 15:49
Surr: 1,2-Dichloroethane-d4	86.0			70-128	%REC	1	07-Apr-2014 15:49
Surr: 4-Bromofluorobenzene	86.9			73-126	%REC	1	07-Apr-2014 15:49
Surr: Dibromofluoromethane	91.8			71-128	%REC	1	07-Apr-2014 15:49
Surr: Toluene-d8	94.1			73-127	%REC	1	07-Apr-2014 15:49
<b>TEXAS TPH - TX1005</b>			<b>Method: TX1005</b>			Prep: TX1005PR / 02-Apr-2014	
nC6 to nC12	U		22	110	mg/Kg-dry	1	03-Apr-2014 15:01
>nC12 to nC28	U		22	110	mg/Kg-dry	1	03-Apr-2014 15:01
>nC28 to nC35	U		22	110	mg/Kg-dry	1	03-Apr-2014 15:01
Total Petroleum Hydrocarbon	U		22	110	mg/Kg-dry	1	03-Apr-2014 15:01
Surr: 2-Fluorobiphenyl	84.1			70-130	%REC	1	03-Apr-2014 15:01
Surr: Trifluoromethyl benzene	81.9			70-130	%REC	1	03-Apr-2014 15:01
<b>MOISTURE</b>			<b>Method: SW3550</b>			Analyst: KAH	
Percent Moisture	1.47		0.0100	0.0100	wt%	1	03-Apr-2014 14:50

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB05  
 Collection Date: 31-Mar-2014 13:55

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-03  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLG	
1,1'-Biphenyl	U		42	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:10
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
2-Chlorophenol	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:10
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	07-Apr-2014 16:10
2-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
2-Nitroaniline	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:10
2-Nitrophenol	U		18	170	ug/Kg-dry	1	07-Apr-2014 16:10
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	07-Apr-2014 16:10
3-Nitroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:10
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
4-Chloro-3-methylphenol	U		34	170	ug/Kg-dry	1	07-Apr-2014 16:10
4-Chloroaniline	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:10
4-Nitroaniline	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
4-Nitrophenol	U		16	170	ug/Kg-dry	1	07-Apr-2014 16:10
Acenaphthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
Acenaphthylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Acetophenone	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Anthracene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Atrazine	U		41	170	ug/Kg-dry	1	07-Apr-2014 16:10
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	07-Apr-2014 16:10
Benzaldehyde	U	n	41	170	ug/Kg-dry	1	07-Apr-2014 16:10
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Caprolactam	U		52	170	ug/Kg-dry	1	07-Apr-2014 16:10
Carbazole	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB05  
 Collection Date: 31-Mar-2014 13:55

**ANALYTICAL REPORT**

WorkOrder: HS14040094  
 Lab ID: HS14040094-03  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 07-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:10
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
Dibenzofuran	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
Diethyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	07-Apr-2014 16:10
Fluoranthene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
Fluorene	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:10
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	07-Apr-2014 16:10
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
Hexachloroethane	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
Isophorone	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Naphthalene	U		13	170	ug/Kg-dry	1	07-Apr-2014 16:10
Nitrobenzene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	07-Apr-2014 16:10
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	07-Apr-2014 16:10
Pentachlorophenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Phenanthrene	U		14	170	ug/Kg-dry	1	07-Apr-2014 16:10
Phenol	U		11	170	ug/Kg-dry	1	07-Apr-2014 16:10
Pyrene	U		44	170	ug/Kg-dry	1	07-Apr-2014 16:10
<i>Surr: 2,4,6-Tribromophenol</i>	83.1			36-126	%REC	1	07-Apr-2014 16:10
<i>Surr: 2-Fluorobiphenyl</i>	68.7			43-125	%REC	1	07-Apr-2014 16:10
<i>Surr: 2-Fluorophenol</i>	57.3			37-125	%REC	1	07-Apr-2014 16:10
<i>Surr: 4-Terphenyl-d14</i>	68.8			32-125	%REC	1	07-Apr-2014 16:10
<i>Surr: Nitrobenzene-d5</i>	69.9			37-125	%REC	1	07-Apr-2014 16:10
<i>Surr: Phenol-d6</i>	56.3			40-125	%REC	1	07-Apr-2014 16:10
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 07-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 04:51
2,4,5-TP (Silvex)	U		1.7	3.4	ug/Kg-dry	1	17-Apr-2014 04:51
2,4-D	U		0.71	6.7	ug/Kg-dry	1	17-Apr-2014 04:51
2,4-DB	U		0.91	6.7	ug/Kg-dry	1	17-Apr-2014 04:51
Dalapon	U		1.2	3.4	ug/Kg-dry	1	17-Apr-2014 04:51
Dicamba	U		1.3	3.4	ug/Kg-dry	1	17-Apr-2014 04:51
Dichlorprop	U		1.6	6.7	ug/Kg-dry	1	17-Apr-2014 04:51
Dinoseb	U		1.4	3.4	ug/Kg-dry	1	17-Apr-2014 04:51
MCPA	U		100	670	ug/Kg-dry	1	17-Apr-2014 04:51
MCPP	U		160	670	ug/Kg-dry	1	17-Apr-2014 04:51
<i>Surr: DCAA</i>	48.3			30-150	%REC	1	17-Apr-2014 04:51

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB05  
 Collection Date: 31-Mar-2014 13:55

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-03  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.51	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
4,4'-DDE	U		0.51	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
4,4'-DDT	U		0.51	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
Aldrin	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
alpha-BHC	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
beta-BHC	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
Chlordane	U		2.0	17	ug/Kg-dry	1	10-Apr-2014 03:50
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
Dieldrin	U		0.51	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
Endosulfan II	U		0.61	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
Endosulfan sulfate	U		0.61	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
Endrin	U		0.61	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
Endrin aldehyde	U		0.61	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
Endrin ketone	U		0.61	3.3	ug/Kg-dry	1	10-Apr-2014 03:50
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
Heptachlor	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
Methoxychlor	U		3.4	17	ug/Kg-dry	1	10-Apr-2014 03:50
Toxaphene	U		4.9	17	ug/Kg-dry	1	10-Apr-2014 03:50
Surr: Decachlorobiphenyl	85.2			59-144	%REC	1	10-Apr-2014 03:50
Surr: Tetrachloro-m-xylene	89.8			56.9-130	%REC	1	10-Apr-2014 03:50
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 07-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	10-Apr-2014 03:50
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>				Analyst: SE	
Aroclor 1016	U		4.2	17	ug/Kg-dry	1	08-Apr-2014 01:46
Aroclor 1221	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:46
Aroclor 1232	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:46
Aroclor 1242	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:46
Aroclor 1248	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:46
Aroclor 1254	U		17	17	ug/Kg-dry	1	08-Apr-2014 01:46
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	08-Apr-2014 01:46
Surr: Decachlorobiphenyl	104			54-143	%REC	1	08-Apr-2014 01:46
Surr: Tetrachloro-m-xylene	77.8			55-137	%REC	1	08-Apr-2014 01:46

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB05  
 Collection Date: 31-Mar-2014 13:55

**ANALYTICAL REPORT**

WorkOrder:HS14040094  
 Lab ID:HS14040094-03  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 08-Apr-2014		Analyst: ALR	
Arsenic	1.32		0.0963	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
Barium	30.1		0.0771	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
Cadmium	0.0504	J	0.0482	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
Chromium	3.35		0.0867	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
Lead	3.15		0.0482	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
Selenium	0.312	J	0.173	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
Silver	U		0.0771	0.482	mg/Kg-dry	1	08-Apr-2014 15:13
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	08-Apr-2014 17:33
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 08-Apr-2014		Analyst: OFO	
Mercury	U		0.507	3.59	ug/Kg-dry	1	08-Apr-2014 14:20
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	1.84		0.0100	0.0100	wt%	1	03-Apr-2014 15:50
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: KKB	
pH	8.41	H	0.100	0.100	pH Units	1	08-Apr-2014 17:26
Temp Deg C @pH	21.2	H	0	0	pH Units	1	08-Apr-2014 17:26
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	08-Apr-2014 10:30
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	08-Apr-2014 09:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SS-06



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS-006  
 Collection Date: 09-Apr-2014 10:30

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>				Analyst: WLR
1,1,1-Trichloroethane	U		1.7	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,1,2,2-Tetrachloroethane	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.3	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,1,2-Trichloroethane	U		2.0	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,1-Dichloroethane	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,1-Dichloroethene	U		1.5	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,2,4-Trichlorobenzene	U		0.90	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,2-Dibromo-3-chloropropane	U		1.3	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,2-Dibromoethane	U		0.70	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,2-Dichlorobenzene	U		0.80	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,2-Dichloroethane	U		0.60	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,2-Dichloropropane	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,3-Dichlorobenzene	U		0.90	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
1,4-Dichlorobenzene	U		0.70	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
2-Butanone	U		2.2	10	ug/Kg-dry	1	16-Apr-2014 13:09
2-Hexanone	U		1.7	10	ug/Kg-dry	1	16-Apr-2014 13:09
4-Methyl-2-pentanone	U		1.0	10	ug/Kg-dry	1	16-Apr-2014 13:09
Acetone	U		4.6	20	ug/Kg-dry	1	16-Apr-2014 13:09
Benzene	U		0.60	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Bromodichloromethane	U		0.60	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Bromoform	U		0.70	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Bromomethane	U		1.0	10	ug/Kg-dry	1	16-Apr-2014 13:09
Carbon disulfide	U		1.6	10	ug/Kg-dry	1	16-Apr-2014 13:09
Carbon tetrachloride	U		1.2	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Chlorobenzene	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Chloroethane	U		1.0	10	ug/Kg-dry	1	16-Apr-2014 13:09
Chloroform	U		1.8	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Chloromethane	U		0.90	10	ug/Kg-dry	1	16-Apr-2014 13:09
cis-1,2-Dichloroethene	U		1.5	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
cis-1,3-Dichloropropene	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Cyclohexane	U	n	1.2	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Dibromochloromethane	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Dichlorodifluoromethane	U		1.8	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Dichloromethane	U		1.4	10	ug/Kg-dry	1	16-Apr-2014 13:09
Ethylbenzene	U		0.90	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Isopropylbenzene	U		1.0	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
m,p-Xylene	U		1.7	10	ug/Kg-dry	1	16-Apr-2014 13:09
Methyl acetate	U		1.0	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Methyl tert-butyl ether	U		1.9	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Methylcyclohexane	U		1.5	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
o-Xylene	U		1.0	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Styrene	U		0.60	5.0	ug/Kg-dry	1	16-Apr-2014 13:09

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS-006  
 Collection Date: 09-Apr-2014 10:30

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method: SW8260</b>				Analyst: WLR	
Tetrachloroethene	U		1.0	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Toluene	U		0.70	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
trans-1,2-Dichloroethene	U		0.90	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
trans-1,3-Dichloropropene	U		0.50	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Trichloroethene	U		1.6	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Trichlorofluoromethane	U		0.80	5.0	ug/Kg-dry	1	16-Apr-2014 13:09
Vinyl chloride	U		1.0	2.0	ug/Kg-dry	1	16-Apr-2014 13:09
Xylenes, Total	U		2.6	15	ug/Kg-dry	1	16-Apr-2014 13:09
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>94.1</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:09</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>92.2</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:09</i>
<i>Surr: Dibromofluoromethane</i>	<i>95.2</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:09</i>
<i>Surr: Toluene-d8</i>	<i>105</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:09</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS-006  
 Collection Date: 09-Apr-2014 10:30

**ANALYTICAL REPORT**

WorkOrder:HS14040500  
 Lab ID:HS14040500-01  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method:SW8270</b>		Prep:SW3541 / 16-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		42	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,4,5-Trichlorophenol	U		21	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	16-Apr-2014 16:58
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
2-Chlorophenol	U		10	170	ug/Kg-dry	1	16-Apr-2014 16:58
2-Methylnaphthalene	U		27	170	ug/Kg-dry	1	16-Apr-2014 16:58
2-Methylphenol	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
2-Nitroaniline	U		16	170	ug/Kg-dry	1	16-Apr-2014 16:58
2-Nitrophenol	U		18	170	ug/Kg-dry	1	16-Apr-2014 16:58
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
3,3'-Dichlorobenzidine	U		19	170	ug/Kg-dry	1	16-Apr-2014 16:58
3-Nitroaniline	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
4,6-Dinitro-2-methylphenol	U		16	170	ug/Kg-dry	1	16-Apr-2014 16:58
4-Bromophenyl phenyl ether	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
4-Chloro-3-methylphenol	U		33	170	ug/Kg-dry	1	16-Apr-2014 16:58
4-Chloroaniline	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
4-Chlorophenyl phenyl ether	U		16	170	ug/Kg-dry	1	16-Apr-2014 16:58
4-Nitroaniline	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
4-Nitrophenol	U		16	170	ug/Kg-dry	1	16-Apr-2014 16:58
Acenaphthene	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
Acenaphthylene	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Acetophenone	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Anthracene	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Atrazine	U		41	170	ug/Kg-dry	1	16-Apr-2014 16:58
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	16-Apr-2014 16:58
Benzaldehyde	U	n	41	170	ug/Kg-dry	1	16-Apr-2014 16:58
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Benzo(k)fluoranthene	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Caprolactam	U		52	170	ug/Kg-dry	1	16-Apr-2014 16:58
Carbazole	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS-006  
 Collection Date: 09-Apr-2014 10:30

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-01  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 16-Apr-2014		Analyst: JLJ	
Chrysene	U		17	170	ug/Kg-dry	1	16-Apr-2014 16:58
Dibenz(a,h)anthracene	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
Dibenzofuran	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
Diethyl phthalate	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Dimethyl phthalate	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Di-n-octyl phthalate	U		19	170	ug/Kg-dry	1	16-Apr-2014 16:58
Fluoranthene	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
Fluorene	U		17	170	ug/Kg-dry	1	16-Apr-2014 16:58
Hexachlorobenzene	U		15	170	ug/Kg-dry	1	16-Apr-2014 16:58
Hexachlorobutadiene	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
Hexachlorocyclopentadiene	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
Hexachloroethane	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Indeno(1,2,3-cd)pyrene	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
Isophorone	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Naphthalene	U		13	170	ug/Kg-dry	1	16-Apr-2014 16:58
Nitrobenzene	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
N-Nitrosodi-n-propylamine	U		17	170	ug/Kg-dry	1	16-Apr-2014 16:58
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	16-Apr-2014 16:58
Pentachlorophenol	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Phenanthrene	U		14	170	ug/Kg-dry	1	16-Apr-2014 16:58
Phenol	U		11	170	ug/Kg-dry	1	16-Apr-2014 16:58
Pyrene	U		44	170	ug/Kg-dry	1	16-Apr-2014 16:58
<i>Surr: 2,4,6-Tribromophenol</i>	67.4			36-126	%REC	1	16-Apr-2014 16:58
<i>Surr: 2-Fluorobiphenyl</i>	63.4			43-125	%REC	1	16-Apr-2014 16:58
<i>Surr: 2-Fluorophenol</i>	49.6			37-125	%REC	1	16-Apr-2014 16:58
<i>Surr: 4-Terphenyl-d14</i>	65.1			32-125	%REC	1	16-Apr-2014 16:58
<i>Surr: Nitrobenzene-d5</i>	62.1			37-125	%REC	1	16-Apr-2014 16:58
<i>Surr: Phenol-d6</i>	50.0			40-125	%REC	1	16-Apr-2014 16:58
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 16-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.3	ug/Kg-dry	1	23-Apr-2014 03:24
2,4,5-TP (Silvex)	U		1.7	3.3	ug/Kg-dry	1	23-Apr-2014 03:24
2,4-D	U		0.71	6.7	ug/Kg-dry	1	23-Apr-2014 03:24
2,4-DB	U		0.91	6.7	ug/Kg-dry	1	23-Apr-2014 03:24
Dalapon	U		1.2	3.3	ug/Kg-dry	1	23-Apr-2014 03:24
Dicamba	U		1.3	3.3	ug/Kg-dry	1	23-Apr-2014 03:24
<b>Dichlorprop</b>	<b>5.2</b>	<b>J</b>	<b>1.6</b>	<b>6.7</b>	<b>ug/Kg-dry</b>	<b>1</b>	<b>23-Apr-2014 03:24</b>
Dinoseb	U		1.4	3.3	ug/Kg-dry	1	23-Apr-2014 03:24
MCPA	U		100	670	ug/Kg-dry	1	23-Apr-2014 03:24
MCPP	U		160	670	ug/Kg-dry	1	23-Apr-2014 03:24
<i>Surr: DCAA</i>	118			30-150	%REC	1	23-Apr-2014 03:24

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS-006  
 Collection Date: 09-Apr-2014 10:30

**ANALYTICAL REPORT**

WorkOrder:HS14040500  
 Lab ID:HS14040500-01  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 15-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
4,4'-DDE	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
4,4'-DDT	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
Aldrin	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
alpha-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
beta-BHC	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
Chlordane	U		2.0	17	ug/Kg-dry	1	17-Apr-2014 01:56
delta-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
Dieldrin	U		0.50	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
Endosulfan I	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
Endosulfan II	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
Endosulfan sulfate	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
Endrin	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
Endrin aldehyde	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
Endrin ketone	U		0.61	3.3	ug/Kg-dry	1	17-Apr-2014 01:56
gamma-BHC	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
Heptachlor	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
Heptachlor epoxide	U		0.30	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
Methoxychlor	U		3.4	17	ug/Kg-dry	1	17-Apr-2014 01:56
Toxaphene	U		4.8	17	ug/Kg-dry	1	17-Apr-2014 01:56
Surr: Decachlorobiphenyl	62.7			59-144	%REC	1	17-Apr-2014 01:56
Surr: Tetrachloro-m-xylene	62.9			56.9-130	%REC	1	17-Apr-2014 01:56
<b>NC6 TO NC35 PETROLEUM HYDROCARBONS</b>		<b>Method:TX1006</b>		Prep:TX1006PR / 17-Apr-2014		Analyst: RPM	
Aliphatics nC6	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aliphatics >nC6 to nC8	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aliphatics >nC8 to nC10	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aliphatics >nC10 to nC12	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aliphatics >nC12 to nC16	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aliphatics >nC16 to nC21	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
<b>Aliphatics &gt;nC21 to nC35</b>	<b>200</b>	<b>n</b>	<b>9.7</b>	<b>19</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>
<b>Total Aliphatic Fraction</b>	<b>200</b>	<b>n</b>	<b>9.7</b>	<b>19</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>
<b>Aliphatics Relative % Distribution</b>	<b>85</b>	<b>n</b>	<b>0</b>	<b>0</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>
Aromatics >nC7 to nC8	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aromatics >nC8 to nC10	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aromatics >nC10 to nC12	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aromatics >nC12 to nC16	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
Aromatics >nC16 to nC21	U	n	9.7	19	mg/Kg-dry	1	17-Apr-2014 16:45
<b>Aromatics &gt;nC21 to nC35</b>	<b>37</b>	<b>n</b>	<b>9.7</b>	<b>19</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>
<b>Total Aromatic Fraction</b>	<b>37.0</b>	<b>n</b>	<b>9.7</b>	<b>19</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>
<b>Aromatics Relative % Distribution</b>	<b>16</b>	<b>n</b>	<b>0</b>	<b>0</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>
<b>Total Petroleum Hydrocarbons</b>	<b>240</b>	<b>n</b>	<b>31</b>	<b>97</b>	<b>mg/Kg-dry</b>	<b>1</b>	<b>17-Apr-2014 16:45</b>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SS-006  
 Collection Date: 09-Apr-2014 10:30

**ANALYTICAL REPORT**

WorkOrder:HS14040500  
 Lab ID:HS14040500-01  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method:SW8081</b>		Prep:SW3546 / 15-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
gamma-Chlordane	U		0.20	1.7	ug/Kg-dry	1	17-Apr-2014 01:56
<b>PCBS BY SW8082A</b>		<b>Method:SW8082</b>		Prep:SW3546/3665A / 15-Apr-2014		Analyst: SE	
Aroclor 1016	U		4.2	17	ug/Kg-dry	1	15-Apr-2014 23:49
Aroclor 1221	U		17	17	ug/Kg-dry	1	15-Apr-2014 23:49
Aroclor 1232	U		17	17	ug/Kg-dry	1	15-Apr-2014 23:49
Aroclor 1242	U		17	17	ug/Kg-dry	1	15-Apr-2014 23:49
Aroclor 1248	U		17	17	ug/Kg-dry	1	15-Apr-2014 23:49
Aroclor 1254	U		17	17	ug/Kg-dry	1	15-Apr-2014 23:49
Aroclor 1260	U		2.4	17	ug/Kg-dry	1	15-Apr-2014 23:49
Surr: Decachlorobiphenyl	58.1			54-143	%REC	1	15-Apr-2014 23:49
Surr: Tetrachloro-m-xylene	56.2			55-137	%REC	1	15-Apr-2014 23:49
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 21-Apr-2014		Analyst: ALR	
Arsenic	1.83		0.0953	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
Barium	35.8		0.0763	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
Cadmium	U		0.0477	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
Chromium	4.15		0.0858	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
Lead	4.37		0.0477	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
Selenium	0.394	J	0.172	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
Silver	U		0.0763	0.477	mg/Kg-dry	1	21-Apr-2014 19:48
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	18-Apr-2014 17:43
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 21-Apr-2014		Analyst: OFO	
Mercury	3.26	J	0.490	3.46	ug/Kg-dry	1	21-Apr-2014 15:37
<b>TEXAS TPH - TX1005</b>		<b>Method:TX1005</b>		Prep:TX1005PR / 15-Apr-2014		Analyst: RPM	
nC6 to nC12	U		19	97	mg/Kg-dry	1	16-Apr-2014 03:07
>nC12 to nC28	65	J	19	97	mg/Kg-dry	1	16-Apr-2014 03:07
>nC28 to nC35	210		19	97	mg/Kg-dry	1	16-Apr-2014 03:07
Total Petroleum Hydrocarbon	275		19	97	mg/Kg-dry	1	16-Apr-2014 03:07
Surr: 2-Fluorobiphenyl	88.7			70-130	%REC	1	16-Apr-2014 03:07
Surr: Trifluoromethyl benzene	83.3			70-130	%REC	1	16-Apr-2014 03:07
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	1.47		0.0100	0.0100	wt%	1	17-Apr-2014 15:15
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: MJC	
pH	7.84	H	0.100	0.100	pH Units	1	18-Apr-2014 16:21
Temp Deg C @pH	22.7	H	0	0	pH Units	1	18-Apr-2014 16:21
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	16-Apr-2014 14:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	16-Apr-2014 15:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.

FTBL-SB-06



Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB-006  
 Collection Date: 09-Apr-2014 10:45

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>			<b>Method: SW8260</b>			Analyst: WLR	
1,1,1-Trichloroethane	U		1.8	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,1,2,2-Tetrachloroethane	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,1,2-Trichlor-1,2,2-trifluoroethane	U		1.4	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,1,2-Trichloroethane	U		2.1	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,1-Dichloroethane	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,1-Dichloroethene	U		1.6	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,2,4-Trichlorobenzene	U		0.94	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,2-Dibromo-3-chloropropane	U		1.4	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,2-Dibromoethane	U		0.73	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,2-Dichlorobenzene	U		0.84	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,2-Dichloroethane	U		0.63	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,2-Dichloropropane	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,3-Dichlorobenzene	U		0.94	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
1,4-Dichlorobenzene	U		0.73	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
2-Butanone	U		2.3	10	ug/Kg-dry	1	16-Apr-2014 13:38
2-Hexanone	U		1.8	10	ug/Kg-dry	1	16-Apr-2014 13:38
4-Methyl-2-pentanone	U		1.0	10	ug/Kg-dry	1	16-Apr-2014 13:38
Acetone	U		4.8	21	ug/Kg-dry	1	16-Apr-2014 13:38
Benzene	U		0.63	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Bromodichloromethane	U		0.63	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Bromoform	U		0.73	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Bromomethane	U		1.0	10	ug/Kg-dry	1	16-Apr-2014 13:38
Carbon disulfide	U		1.7	10	ug/Kg-dry	1	16-Apr-2014 13:38
Carbon tetrachloride	U		1.3	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Chlorobenzene	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Chloroethane	U		1.0	10	ug/Kg-dry	1	16-Apr-2014 13:38
Chloroform	U		1.9	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Chloromethane	U		0.94	10	ug/Kg-dry	1	16-Apr-2014 13:38
cis-1,2-Dichloroethene	U		1.6	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
cis-1,3-Dichloropropene	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Cyclohexane	U	n	1.3	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Dibromochloromethane	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Dichlorodifluoromethane	U		1.9	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Dichloromethane	U		1.5	10	ug/Kg-dry	1	16-Apr-2014 13:38
Ethylbenzene	U		0.94	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Isopropylbenzene	U		1.0	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
m,p-Xylene	U		1.8	10	ug/Kg-dry	1	16-Apr-2014 13:38
Methyl acetate	U		1.0	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Methyl tert-butyl ether	U		2.0	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Methylcyclohexane	U		1.6	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
o-Xylene	U		1.0	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Styrene	U		0.63	5.2	ug/Kg-dry	1	16-Apr-2014 13:38

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB-006  
 Collection Date: 09-Apr-2014 10:45

**ANALYTICAL REPORT**

WorkOrder:HS14040500  
 Lab ID:HS14040500-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TCL VOLATILES - SW8260C</b>		<b>Method:SW8260</b>				Analyst: WLR	
Tetrachloroethene	U		1.0	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Toluene	U		0.73	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
trans-1,2-Dichloroethene	U		0.94	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
trans-1,3-Dichloropropene	U		0.52	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Trichloroethene	U		1.7	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Trichlorofluoromethane	U		0.84	5.2	ug/Kg-dry	1	16-Apr-2014 13:38
Vinyl chloride	U		1.0	2.1	ug/Kg-dry	1	16-Apr-2014 13:38
Xylenes, Total	U		2.7	16	ug/Kg-dry	1	16-Apr-2014 13:38
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>99.8</i>			<i>70-128</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:38</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>95.0</i>			<i>73-126</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:38</i>
<i>Surr: Dibromofluoromethane</i>	<i>99.2</i>			<i>71-128</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:38</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			<i>73-127</i>	<i>%REC</i>	<i>1</i>	<i>16-Apr-2014 13:38</i>

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB-006  
 Collection Date: 09-Apr-2014 10:45

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 16-Apr-2014		Analyst: JLJ	
1,1'-Biphenyl	U		43	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,4,5-Trichlorophenol	U		22	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,4,6-Trichlorophenol	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,4-Dichlorophenol	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,4-Dimethylphenol	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,4-Dinitrophenol	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,4-Dinitrotoluene	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
2,6-Dinitrotoluene	U		10	170	ug/Kg-dry	1	22-Apr-2014 20:59
2-Chloronaphthalene	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
2-Chlorophenol	U		10	170	ug/Kg-dry	1	22-Apr-2014 20:59
2-Methylnaphthalene	U		28	170	ug/Kg-dry	1	22-Apr-2014 20:59
2-Methylphenol	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
2-Nitroaniline	U		17	170	ug/Kg-dry	1	22-Apr-2014 20:59
2-Nitrophenol	U		19	170	ug/Kg-dry	1	22-Apr-2014 20:59
3&4-Methylphenol	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
3,3'-Dichlorobenzidine	U		20	170	ug/Kg-dry	1	22-Apr-2014 20:59
3-Nitroaniline	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
4,6-Dinitro-2-methylphenol	U		17	170	ug/Kg-dry	1	22-Apr-2014 20:59
4-Bromophenyl phenyl ether	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
4-Chloro-3-methylphenol	U		34	170	ug/Kg-dry	1	22-Apr-2014 20:59
4-Chloroaniline	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
4-Chlorophenyl phenyl ether	U		17	170	ug/Kg-dry	1	22-Apr-2014 20:59
4-Nitroaniline	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
4-Nitrophenol	U		17	170	ug/Kg-dry	1	22-Apr-2014 20:59
Acenaphthene	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
Acenaphthylene	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Acetophenone	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Anthracene	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Atrazine	U		41	170	ug/Kg-dry	1	22-Apr-2014 20:59
Benz(a)anthracene	U		10	170	ug/Kg-dry	1	22-Apr-2014 20:59
Benzaldehyde	U	n	41	170	ug/Kg-dry	1	22-Apr-2014 20:59
Benzo(a)pyrene	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Benzo(b)fluoranthene	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Benzo(g,h,i)perylene	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Benzo(k)fluoranthene	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
Bis(2-chloroethoxy)methane	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Bis(2-chloroethyl)ether	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
Bis(2-chloroisopropyl)ether	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Bis(2-ethylhexyl)phthalate	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
Butyl benzyl phthalate	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Caprolactam	U		53	170	ug/Kg-dry	1	22-Apr-2014 20:59
Carbazole	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB-006  
 Collection Date: 09-Apr-2014 10:45

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SEMIVOLATILES - SW8270D</b>		<b>Method: SW8270</b>		Prep: SW3541 / 16-Apr-2014		Analyst: JLJ	
Chrysene	U		18	170	ug/Kg-dry	1	22-Apr-2014 20:59
Dibenz(a,h)anthracene	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
Dibenzofuran	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
Diethyl phthalate	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Dimethyl phthalate	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
Di-n-butyl phthalate	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Di-n-octyl phthalate	U		20	170	ug/Kg-dry	1	22-Apr-2014 20:59
Fluoranthene	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
Fluorene	U		18	170	ug/Kg-dry	1	22-Apr-2014 20:59
Hexachlorobenzene	U		16	170	ug/Kg-dry	1	22-Apr-2014 20:59
Hexachlorobutadiene	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
Hexachlorocyclopentadiene	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
Hexachloroethane	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Indeno(1,2,3-cd)pyrene	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
Isophorone	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Naphthalene	U		13	170	ug/Kg-dry	1	22-Apr-2014 20:59
Nitrobenzene	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
N-Nitrosodi-n-propylamine	U		18	170	ug/Kg-dry	1	22-Apr-2014 20:59
N-Nitrosodiphenylamine	U		12	170	ug/Kg-dry	1	22-Apr-2014 20:59
Pentachlorophenol	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Phenanthrene	U		15	170	ug/Kg-dry	1	22-Apr-2014 20:59
Phenol	U		11	170	ug/Kg-dry	1	22-Apr-2014 20:59
Pyrene	U		45	170	ug/Kg-dry	1	22-Apr-2014 20:59
<i>Surr: 2,4,6-Tribromophenol</i>	72.3			36-126	%REC	1	22-Apr-2014 20:59
<i>Surr: 2-Fluorobiphenyl</i>	57.3			43-125	%REC	1	22-Apr-2014 20:59
<i>Surr: 2-Fluorophenol</i>	46.1			37-125	%REC	1	22-Apr-2014 20:59
<i>Surr: 4-Terphenyl-d14</i>	59.9			32-125	%REC	1	22-Apr-2014 20:59
<i>Surr: Nitrobenzene-d5</i>	55.3			37-125	%REC	1	22-Apr-2014 20:59
<i>Surr: Phenol-d6</i>	47.8			40-125	%REC	1	22-Apr-2014 20:59
<b>CHLORINATED HERBICIDES - SW8151A</b>		<b>Method: SW8151</b>		Prep: SW3550 / 16-Apr-2014		Analyst: SE	
2,4,5-T	U		1.4	3.4	ug/Kg-dry	1	23-Apr-2014 05:15
2,4,5-TP (Silvex)	U		1.8	3.4	ug/Kg-dry	1	23-Apr-2014 05:15
2,4-D	U		0.72	6.8	ug/Kg-dry	1	23-Apr-2014 05:15
2,4-DB	U		0.93	6.8	ug/Kg-dry	1	23-Apr-2014 05:15
Dalapon	U		1.2	3.4	ug/Kg-dry	1	23-Apr-2014 05:15
Dicamba	U		1.3	3.4	ug/Kg-dry	1	23-Apr-2014 05:15
Dichlorprop	U		1.7	6.8	ug/Kg-dry	1	23-Apr-2014 05:15
Dinoseb	U		1.4	3.4	ug/Kg-dry	1	23-Apr-2014 05:15
MCPA	U		100	680	ug/Kg-dry	1	23-Apr-2014 05:15
MCPP	U		170	680	ug/Kg-dry	1	23-Apr-2014 05:15
<i>Surr: DCAA</i>	72.4			30-150	%REC	1	23-Apr-2014 05:15

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB-006  
 Collection Date: 09-Apr-2014 10:45

**ANALYTICAL REPORT**

WorkOrder: HS14040500  
 Lab ID: HS14040500-02  
 Matrix: Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>ORGANOCHLORINE PESTICIDES - SW8081B</b>		<b>Method: SW8081</b>		Prep: SW3546 / 15-Apr-2014		Analyst: SE	
4,4'-DDD	U		0.52	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
4,4'-DDE	U		0.52	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
4,4'-DDT	U		0.52	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
Aldrin	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
alpha-BHC	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
beta-BHC	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
Chlordane	U		2.1	17	ug/Kg-dry	1	17-Apr-2014 03:51
delta-BHC	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
Dieldrin	U		0.52	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
Endosulfan I	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
Endosulfan II	U		0.62	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
Endosulfan sulfate	U		0.62	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
Endrin	U		0.62	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
Endrin aldehyde	U		0.62	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
Endrin ketone	U		0.62	3.4	ug/Kg-dry	1	17-Apr-2014 03:51
gamma-BHC	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
Heptachlor	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
Heptachlor epoxide	U		0.31	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
Methoxychlor	U		3.5	17	ug/Kg-dry	1	17-Apr-2014 03:51
Toxaphene	U		5.0	17	ug/Kg-dry	1	17-Apr-2014 03:51
Surr: Decachlorobiphenyl	65.4			59-144	%REC	1	17-Apr-2014 03:51
Surr: Tetrachloro-m-xylene	82.3			56.9-130	%REC	1	17-Apr-2014 03:51
<b>MISCELLANEOUS PESTICIDES - SW8081B</b>		<b>Method: SW8081</b>		Prep: SW3546 / 15-Apr-2014		Analyst: SE	
alpha-Chlordane	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
gamma-Chlordane	U		0.21	1.7	ug/Kg-dry	1	17-Apr-2014 03:51
<b>PCBS BY SW8082A</b>		<b>Method: SW8082</b>		Prep: SW3546/3665A / 15-Apr-2014		Analyst: SE	
Aroclor 1016	U		4.3	17	ug/Kg-dry	1	16-Apr-2014 00:04
Aroclor 1221	U		17	17	ug/Kg-dry	1	16-Apr-2014 00:04
Aroclor 1232	U		17	17	ug/Kg-dry	1	16-Apr-2014 00:04
Aroclor 1242	U		17	17	ug/Kg-dry	1	16-Apr-2014 00:04
Aroclor 1248	U		17	17	ug/Kg-dry	1	16-Apr-2014 00:04
Aroclor 1254	U		17	17	ug/Kg-dry	1	16-Apr-2014 00:04
Aroclor 1260	U		2.5	17	ug/Kg-dry	1	16-Apr-2014 00:04
Surr: Decachlorobiphenyl	66.7			54-143	%REC	1	16-Apr-2014 00:04
Surr: Tetrachloro-m-xylene	63.6			55-137	%REC	1	16-Apr-2014 00:04

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Oneida Total Integrated Enterprises  
 Project: Fort Bliss Texas  
 Sample ID: FTBL-SB-006  
 Collection Date: 09-Apr-2014 10:45

**ANALYTICAL REPORT**

WorkOrder:HS14040500  
 Lab ID:HS14040500-02  
 Matrix:Soil

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SW6020</b>		<b>Method:SW6020</b>		Prep:SW3050A / 21-Apr-2014		Analyst: ALR	
Arsenic	1.72		0.0932	0.466	mg/Kg	1	21-Apr-2014 19:53
Barium	38.8		0.0745	0.466	mg/Kg	1	21-Apr-2014 19:53
Cadmium	U		0.0466	0.466	mg/Kg	1	21-Apr-2014 19:53
Chromium	3.91		0.0839	0.466	mg/Kg	1	21-Apr-2014 19:53
Lead	4.17		0.0466	0.466	mg/Kg	1	21-Apr-2014 19:53
Selenium	0.291	J	0.168	0.466	mg/Kg	1	21-Apr-2014 19:53
Silver	U		0.0745	0.466	mg/Kg	1	21-Apr-2014 19:53
<b>IGNITABILITY</b>		<b>Method:SW1030</b>				Analyst: KAH	
Ignitability, Solid	Negative		0	0	Burn Rate, mm/sec-dry	1	18-Apr-2014 17:43
<b>MERCURY - SW7471B</b>		<b>Method:SW7471A</b>		Prep:SW7471A / 21-Apr-2014		Analyst: OFO	
Mercury	3.98		0.510	3.61	ug/Kg-dry	1	21-Apr-2014 15:39
<b>TEXAS TPH - TX1005</b>		<b>Method:TX1005</b>		Prep:TX1005PR / 15-Apr-2014		Analyst: RPM	
nC6 to nC12	U		20	98	mg/Kg-dry	1	16-Apr-2014 03:36
>nC12 to nC28	U		20	98	mg/Kg-dry	1	16-Apr-2014 03:36
>nC28 to nC35	U		20	98	mg/Kg-dry	1	16-Apr-2014 03:36
Total Petroleum Hydrocarbon	U		20	98	mg/Kg-dry	1	16-Apr-2014 03:36
Surr: 2-Fluorobiphenyl	95.1			70-130	%REC	1	16-Apr-2014 03:36
Surr: Trifluoromethyl benzene	88.0			70-130	%REC	1	16-Apr-2014 03:36
<b>MOISTURE</b>		<b>Method:SW3550</b>				Analyst: KAH	
Percent Moisture	3.55		0.0100	0.0100	wt%	1	17-Apr-2014 15:15
<b>PH - SOIL - SW9045D</b>		<b>Method:SW9045B</b>				Analyst: MJC	
pH	8.15	H	0.100	0.100	pH Units	1	18-Apr-2014 16:21
Temp Deg C @pH	23.3	H	0	0	pH Units	1	18-Apr-2014 16:21
<b>REACTIVE CYANIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Cyanide	U	n	24.7	100	mg/Kg	1	16-Apr-2014 14:00
<b>REACTIVE SULFIDE</b>		<b>Method:SW-846</b>				Analyst: JML	
Reactive Sulfide	U	n	52.1	100	mg/Kg	1	16-Apr-2014 15:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## **Appendix B**

### **Photo Documentation Log**





**Raking aside surface debris at SS-04, Illegal Dump Site, Far East Bliss.**





**SS/SB-01 location, Illegal Dump Site, Far East Bliss.**





**View of glass vials surface debris at SS-01, Illegal Dump Site, Far East Bliss.**





**SS/SB-02 location, Illegal Dump Site, Far East Bliss.**





**SS/SB-03 location, Illegal Dump Site, Far East Bliss.**





**SS/SB-04 location, Illegal Dump Site, Far East Bliss.**





**SS/SB-05 location, Illegal Dump Site, Far East Bliss.**





**SS/SB-06 location, Illegal Dump Site, Far East Bliss.**





**Surveying soil sample locations, Illegal Dump Site, Far East Bliss.**





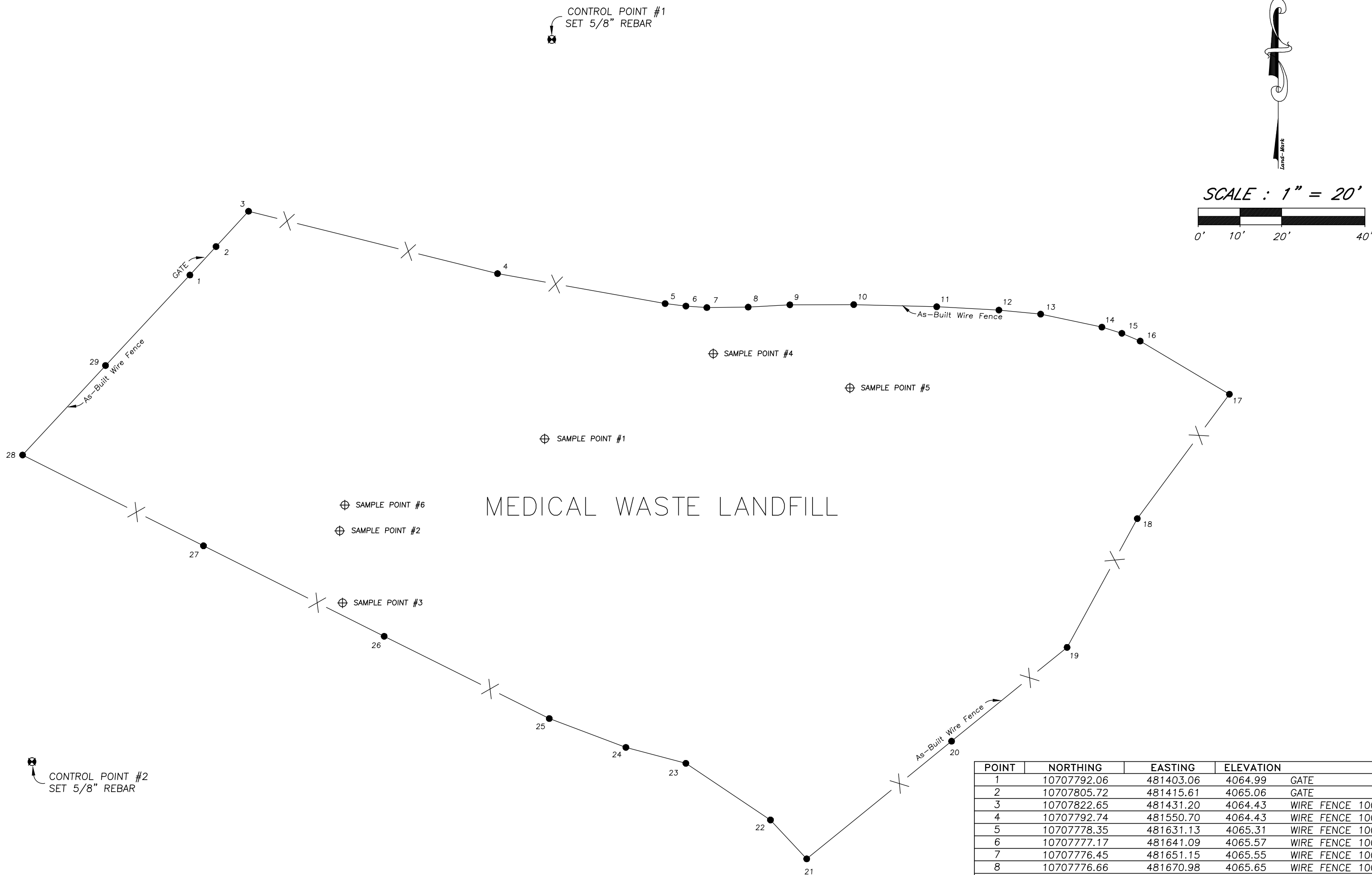
**Surveying the fence line, Illegal Dump Site, Far East Bliss.**



## **Appendix C**

### **Survey Report**





POINT	NORTHING	EASTING	ELEVATION
1	10707792.06	481403.06	4064.99 GATE
2	10707805.72	481415.61	4065.06 GATE
3	10707822.65	481431.20	4064.43 WIRE FENCE 100
4	10707792.74	481550.70	4064.43 WIRE FENCE 100
5	10707778.35	481631.13	4065.31 WIRE FENCE 100
6	10707777.17	481641.09	4065.57 WIRE FENCE 100
7	10707776.45	481651.15	4065.55 WIRE FENCE 100
8	10707776.66	481670.98	4065.65 WIRE FENCE 100
9	10707777.77	481690.98	4065.73 WIRE FENCE 100
10	10707777.86	481721.63	4065.89 WIRE FENCE 100
11	10707776.86	481761.46	4066.40 WIRE FENCE 100
12	10707775.23	481791.31	4066.74 WIRE FENCE 100
13	10707773.30	481811.33	4067.31 WIRE FENCE 100
14	10707767.06	481840.73	4067.85 WIRE FENCE 100
15	10707764.09	481850.32	4068.01 WIRE FENCE 100
16	10707760.37	481859.10	4068.19 WIRE FENCE 100
17	10707734.85	481901.93	4068.95 WIRE FENCE 100
18	10707675.17	481857.73	4069.07 WIRE FENCE 100
19	10707613.37	481824.02	4067.95 WIRE FENCE 100
20	10707568.35	481768.59	4067.16 WIRE FENCE 100
21	10707511.90	481699.06	4066.40 WIRE FENCE 100
22	10707530.55	481681.67	4066.71 WIRE FENCE 100
23	10707557.73	481641.06	4065.25 WIRE FENCE 100
24	10707565.38	481612.28	4065.80 WIRE FENCE 100
25	10707579.23	481575.51	4065.36 WIRE FENCE 100
26	10707618.70	481496.28	4064.88 WIRE FENCE 100
27	10707662.13	481409.57	4064.18 WIRE FENCE 100
28	10707705.69	481322.75	4064.13 WIRE FENCE 100
29	10707748.63	481362.56	4065.63 WIRE FENCE 100
30	10707713.44	481573.27	4065.01 SAMPLE POINT 1
31	10707754.29	481654.20	4066.00 SAMPLE POINT 4
32	10707737.88	481719.77	4066.93 SAMPLE POINT 5
33	10707681.69	481477.38	4064.56 SAMPLE POINT 6
34	10707669.27	481474.90	4064.65 SAMPLE POINT 2
35	10707634.72	481476.31	4064.82 SAMPLE POINT 3
36	10707905.09	481576.71	4065.13 SET 5/8 RBR CP1
38	10707558.49	481327.26	4064.48 SET 5/8 RBR CP2

NOTES

- 1.) HORIZONTAL DATUM is NAD 1983 Texas State Plane Coordinate System, Central Texas Zone 4203, U.S. Survey Feet.
- 2.) VERTICAL DATUM is NAVD 1988.
- 3.) NAD83 TX04 A was referenced for this project with the following coordinates in NAD 1983 Texas Central State Plane System, Central Texas Zone 4203, U.S. Survey Feet  
Northing= 10,637,987.94 Easting= 460,324.14

CERTIFICATION

I hereby certify that the foregoing As-Built survey was made by me or under my supervision and substantially complies with the current Texas Society of Professional Surveyors minimum Standards and Specifications.

b) (6) R.P.L.S.  
State of Texas Reg. No. 5710  
Date of Survey: September 5, 2013  
JOB NO. 14-01-29575

REVISIONS	

DRWG. BY: B.K. CHECKED BY: B.K.

Plat of Survey

MEDICAL WASTE DUMP SITE  
FT. BLISS, TEXAS

  
**Land-Mark Professional Surveying, Inc.**  
1420 Bessemer Avenue, Suite "A"  
El Paso, Texas 79936  
(915) 598-1300  
Fax (915) 598-1221  
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"Serving Texas, New Mexico & Arizona"



## **Appendix D**

### **Site Inspection Technical Memorandum**





31 May 2014

VIA EMAIL

To: (b) (6), TM, USACE SW Tulsa  
From: (b) (6), PG, LEED AP  
CC: (b) (6)  
Subject: Final Inspection, FTBL-002 & Illegal Dump Site Fencing  
Fort Bliss, El Paso County, TX  
Contract No. W912BV-11-D-0003, TO-06

This Technical Memorandum summarizes Task Order 06 (TO-06) final inspection activities of fencing, gate, and warning signage installation at Fort Bliss (FTBL) sites FTBL-002 and a suspected illegal dump site, Fort Bliss, TX.

## Introduction

Oneida Total Integrated Enterprises, LLC (OTIE) was tasked by the US Army Corps of Engineers, Tulsa District (CESWT) to provide Environmental Restoration Activities, including fencing and gate installation for closed landfill FTBL-002 and a suspected illegal dump site at Fort Bliss, TX. The required activities were performed under Contract W912BV-11-D-0003, TO-06 in support of the Fort Bliss Department of Public Works (DPW). This Inspection Summary Memorandum documents government acceptance of TO-06 Illegal Dump Site in Far East Bliss (Alternate Performance Milestone 0401) and FTBL-002 (Alternate Performance Milestone 0702) fencing, gates, and signage installation, and of the TO Task deliverables.

## Inspection Summary

The FTBL-002 and Illegal Dump Site tasks included installation of perimeter fencing, double-wide access gates, and warning signs in English and Spanish. FTBL-002 required two gates, one on the north side (Photo 1), and one on the west side (Photo 2). The Illegal Dump Site required fencing, signs, and one gate installed on the west side (Photo 3). At FTBL-002 plans were modified to allow an existing gate in the old fence line to remain accessible by tying in the new fencing to the existing gate posts, leaving an opening in the new fence line (Photo 4). Industrial size reflectors were attached to corner posts where appropriate in the case of night time vehicle traffic (Photo 5). Additional sign brackets (Photo 6) were attached at the request of the government via Consulting Services Request 001. All fencing installation and surveying was completed on 11 April 2014.

On 20 May 2014 (b) (6), FTBL DPW Technical Manager and Eric Tennyson, OTIE Project Manager conducted a walk around inspection of the fencing, gates, and signs at the two sites. As the government's representative on this inspection, Mr. Baca verified OTIE's fencing installation as acceptable by visual and physical inspection.

Photo documentation is attached.

(b) (6)

*Project Manager*  
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*Engineering, Science, and Construction*



Photo 1. FTBL-002 north gate.



Photo 2. FTBL-002 west gate.





Photo 3. Illegal Dump Site gate.



Photo 4. FTBL-002 existing gate remains accessible on east side.





Photo 5. Typical industrial reflector installed (Dump Site).



Photo 6. Typical installed supplemental sign bracket.



## **Appendix E**

### **TRRP Tier 1 PCL Tables**



**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area															
Chemical of Concern		CAS	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg)		GWSoil <sub>Ing</sub> (mg/kg)		GWSoil <sub>Class 3</sub> (mg/kg)		AirSoil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		Air-GW- Soil <sub>Inh-V</sub> (mg/kg)		GWSoil for Secondary MCL (mg/kg)		TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg)		GWSoil <sub>Ing</sub> (mg/kg)		GWSoil <sub>Class 3</sub> (mg/kg)		AirSoil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		Air-GW- Soil <sub>Inh-V</sub> (mg/kg)		GWSoil for Secondary MCL (mg/kg)		
Acenaphthene	83-32-9		3.0E+03	n	2.4E+02	n	2.4E+04	n >S	—	—	—	—	—	—	—	3.0E+03	n	1.2E+02	n	1.2E+04	n >S	—	—	—	—	—	—
Acenaphthylene	208-96-8		3.8E+03	n	4.1E+02	n	4.1E+04	n >S	—	—	—	—	—	—	—	3.8E+03	n	2.0E+02	n	2.0E+04	n >S	—	—	—	—	—	—
Acetaldehyde	75-07-0		1.4E+02	n	5.0E+00	n	5.0E+02	n	1.4E+02	n	4.8E+03	n	—	—	—	7.3E+01	n	2.5E+00	n	2.5E+02	n	7.4E+01	n	3.1E+02	n	—	—
Acetate, 2-ethoxyethanol	111-15-9		3.5E+03	n	5.3E+00	n	5.3E+02	n	6.0E+03	n	9.8E+05	n >S	—	—	—	2.3E+03	n	2.7E+00	n	2.7E+02	n	3.1E+03	n	6.3E+04	n	—	—
Acetate, isoamyl	123-92-2		5.9E+03	n	8.7E+00	n	8.7E+02	n	—	—	—	—	—	—	—	5.9E+03	n	4.4E+00	n	4.4E+02	n	—	—	—	—	—	—
Acetate, isobutyl	110-19-0		3.9E+03	n	3.7E+00	n	3.7E+02	n	—	—	—	—	—	—	—	3.9E+03	n	1.8E+00	n	1.8E+02	n	—	—	—	—	—	—
Acetate, sec-butyl	105-46-4		3.9E+03	n	4.0E+00	n	4.0E+02	n	—	—	—	—	—	—	—	3.9E+03	n	2.0E+00	n	2.0E+02	n	—	—	—	—	—	—
Acetic acid*	64-19-7		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Acetone (2-propanone)	67-64-1		6.6E+04	n	4.3E+01	n	4.3E+03	n	6.0E+05	n	1.0E+06	n >S	—	—	—	5.9E+04	n	2.1E+01	n	2.1E+03	n	3.1E+05	n	9.7E+05	n >S	—	—
Acetone cyanohydrin	75-86-5		1.9E+02	n	1.4E-01	n	1.4E+01	n	4.3E+03	n	6.6E+05	n	—	—	—	1.8E+02	n	7.1E-02	n	7.1E+00	n	2.2E+03	n	4.3E+04	n	—	—
Acetonitrile	75-05-8		8.7E+02	n	1.5E+00	n	1.5E+02	n	1.3E+03	n	6.2E+04	n	—	—	—	5.3E+02	n	7.6E-01	n	7.6E+01	n	6.7E+02	n	4.0E+03	n	—	—
Acetophenone	98-86-2		6.7E+03	n	8.2E+00	n	8.2E+02	n	—	—	—	—	—	—	—	6.7E+03	n	4.1E+00	n	4.1E+02	n	—	—	—	—	—	—
Acetylaminofluorene, 2-	53-96-3		1.2E+00	c	4.5E-03	c	4.5E-01	c	1.9E+01	c	1.2E+04	c >S	—	—	—	1.1E+00	c	2.3E-03	c	2.3E-01	c	9.5E+00	c	9.9E+02	c >S	—	—
Acifluorfen, sodium	62476-59-9		8.7E+02	n	2.0E+00	n	2.0E+02	n	—	—	—	—	—	—	—	8.7E+02	n	1.0E+00	n	1.0E+02	n	—	—	—	—	—	—
Acridine	260-94-6		2.0E+02	n	7.5E+00	n	7.5E+02	n	—	—	—	—	—	—	—	2.0E+02	n	3.8E+00	n	3.8E+02	n	—	—	—	—	—	—
Acrolein	107-02-8		3.2E+01	n	2.4E-02	n	2.4E+00	n	1.5E+02	n	1.8E+04	n	—	—	—	2.7E+01	n	1.2E-02	n	1.2E+00	n	7.8E+01	n	1.2E+03	n	—	—
Acrylamide	79-06-1		7.0E+00	c	3.5E-03	c	3.5E-01	c	2.8E+01	c	7.2E+03	c	—	—	—	5.7E+00	c	1.8E-03	c	1.8E-01	c	1.4E+01	c	4.8E+02	c	—	—
Acrylic acid	79-10-7		1.2E+02	n	2.4E+01	n	2.4E+03	n	1.2E+02	n	3.0E+04	n	—	—	—	6.2E+01	n	1.2E+01	n	1.2E+03	n	6.2E+01	n	1.9E+03	n	—	—
Acrylonitrile	107-13-1		3.6E+00	c	3.3E-03	c	3.3E-01	c	5.3E+00	c	1.1E+02	c	—	—	—	2.2E+00	c	1.7E-03	c	1.7E-01	c	2.7E+00	c	7.4E+00	c	—	—
Adipic acid (hexanedioic acid)	124-04-9		1.3E+05	n	9.4E+01	n	9.4E+03	n	—	—	—	—	—	—	—	1.3E+05	n	4.7E+01	n	4.7E+03	n	—	—	—	—	—	—
Alachlor	15972-60-8		5.9E+01	c	1.9E-02	m	1.9E+00	m	—	—	—	—	—	—	—	5.9E+01	c	9.5E-03	m	9.5E-01	m	—	—	—	—	—	—
Aldicarb	116-06-3		6.7E+01	n	1.8E-02	m	1.8E+00	m	—	—	—	—	—	—	—	6.7E+01	n	8.9E-03	m	8.9E-01	m	—	—	—	—	—	—
Aldicarb sulfone	1646-88-4		6.7E+01	n	1.4E-02	m	1.4E+00	m	—	—	—	—	—	—	—	6.7E+01	n	6.9E-03	m	6.9E-01	m	—	—	—	—	—	—
Aldrin	309-00-2		5.0E-02	c	1.0E-01	c	1.0E+01	c	8.3E+00	c	8.5E+03	c >S	—	—	—	5.0E-02	c	5.1E-02	c	5.1E+00	c	4.3E+00	c	5.5E+02	c >S	—	—
Allyl alcohol	107-18-6		5.6E+00	n	2.5E-01	n	2.5E+01	n	5.7E+00	n	6.1E+02	n	—	—	—	2.9E+00	n	1.3E-01	n	1.3E+01	n	2.9E+00	n	3.9E+01	n	—	—
Allyl chloride	107-05-1		1.5E+01	n	1.0E+00	n	1.0E+02	n	1.5E+01	n	3.8E+01	n	—	—	—	7.8E+00	n	5.1E-01	n	5.1E+01	n	7.9E+00	n	2.5E+00	n	—	—
Aluminum	7429-90-5		6.5E+04	n	1.7E+05	n >S	1.0E+06	n >S	—	—	—	—	1.4E+03	6.4E+04	n	8.6E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—	7.1E+02	—
Ametryn	834-12-8		6.0E+02	n	7.2E+00	n	7.2E+02	n	—	—	—	—	—	—	—	6.0E+02	n	3.6E+00	n	3.6E+02	n	—	—	—	—	—	—
Amino-2,6-dinitrotoluene, 4-	19406-51-0		1.1E+01	n	6.7E-02	n	6.7E+00	n	—	—	—	—	—	—	—	1.1E+01	n	3.3E-02	n	3.3E+00	n	—	—	—	—	—	—
Amino-4,6-dinitrotoluene, 2-	35572-78-2		1.1E+01	n	9.9E-02	n	9.9E+00	n	—	—	—	—	—	—	—	1.1E+01	n	5.0E-02	n	5.0E+00	n	—	—	—	—	—	—
Aminobiphenyl, 4- (1,1-biphenyl-4-amine)	92-67-1		7.7E-01	c	1.1E-02	c	1.1E+00	c	—	—	—	—	—	—	—	7.7E-01	c	5.4E-03	c	5.4E-01	c	—	—	—	—	—	—
Aminopyridine, 4-	504-24-5		1.3E+00	n	9.5E-04	n	9.5E-02	n	—	—	—	—	—	—	—	1.3E+00	n	4.7E-04	n	4.7E-02	n	—	—	—	—	—	—
Ammonia	7664-41-7		1.5E+03	n	—	—	—	—	1.5E+03	n	5.7E+03	n	3.1E+00	7.9E+02	n	—	—	—	—	—	—	7.9E+02	n	3.7E+02	n	1.6E+00	—
Ammonium polyphosphate*	6833-79-9		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ammonium salts*	AMMONIUM		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aniline	62-53-3		1.0E+02	n	3.7E-01	c	3.7E+01	c	1.3E+02	n	2.5E+04	n	—	—	—	5.9E+01	n	1.8E-01	c	1.8E+01	c	6.7E+01	n	1.6E+03	n	—	—
Anthracene	120-12-7		1.8E+04	n	6.9E+03	n >S	6.9E+05	n >S	—	—	—	—	—	—	—	1.8E+04	n	3.4E+03	n >S	3.4E+05	n >S	—	—	—	—	—	—
Anthraquinone, 9,10-	84-65-1		1.2E+02	c	1.1E+00	c	1.1E+02	c >S	—	—	—	—	—	—	—	1.2E+02	c	5.7E-01	c	5.7E+01	c >S	—	—	—	—	—	—
Antimony	7440-36-0		1.5E+01	n	5.4E+00	m >S	5.4E+02	m >S	—	—	—	—	—	—	—	1.5E+01	n	2.7E+00	m >S	2.7E+02	m >S	—	—	—	—	—	—
Aramite	140-57-8		1.1E+02	c	—	—	—	—	—	—	—	—	—	—	—	1.1E+02	c	—	—	—	—	—	—	—	—	—	—
Arsenic	7440-38-2		2.4E+01	n	5.0E+00	m >S	5.0E+02	m >S	—	—	—	—	—	—	—	2.4E+01	n	2.5E+00	m >S	2.5E+02	m >S	—	—	—	—	—	—
Arsine	7784-42-1		7.7E-01	n	—	—	—	—	7.7E-01	n	—	—	—	—	—	3.9E-01	n	—	—	—	—	3.9E-01	n	—	—	—	—
Asbestos <sup>5</sup>	1332-21-4		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Atrazine	1912-24-9		2.1E+01	c	2.5E-02	m	2.5E+00	m	—	—	—	—	—	—	—	2.1E+01	c	1.2E-02	m	1.2E+00	m	—	—	—	—	—	—
Azinphos-methyl (guthion)	86-50-0		1.0E+02	n	4.4E-01	n	4.4E+01	n >S	—	—	—	—	—	—	—	1.0E+02	n	2.2E-01	n	2.2E+01	n >S	—	—	—	—	—	—
Azobenzene	103-33-3		3.7E+01	c	1.8E+01	c	1.8E+03	c	1.4E+03	c	1.0E+06	c >S	—	—	—	3.6E+01	c	8.8E+00	c	8.8E+02	c	7.1E+02	c	9.4E+04	c >S	—	—
Barium	7440-39-3		8.1E+03	n	4.4E+02	m >S	4.4E+04	m >S	—	—	—	—	—	—	—	8.1E+03	n	2.2E+02	m >S	2.2E+04	m >S	—	—	—	—	—	—
Bayleton	43121-43-3		2.0E+03	n	7.4E+00	n	7.4E+02	n >S	—	—	—	—	—	—	—	2.0E+03	n	3.7E+00	n	3.7E+02	n >S	—	—	—	—	—	—
Benefin (benfluralin)	1861-40-1		1.9E+04	n	4.9E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—	—	1.9E+04	n	2.4E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—
Benomyl	17804-35-2		3.3E+03	n	3.1E+00	n	3.1E+02	n >S	—	—	—	—	—	—	—	3.3E+03	n	1.5E+00	n	1.5E+02	n >S	—	—	—	—	—	—
Benz-a-anthracene	56-55-3		5.7E+00	c	1.8E+01	c	1.8E+03	c >S	3.7E+03	c	1.0E+06	c >S	—	—	—	5.6E+00	c	8.9E+00	c	8.9E+02	c >S	1.9E+03	c	1.0E+06	c >S	—	—

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area											
Chemical of Concern		CAS	Tot <sup>1</sup> Soil <sub>Comb</sub> <sup>2</sup> (mg/kg)		note <sup>3</sup>	GW <sup>1</sup> Soil <sub>Ing</sub> <sup>2</sup> (mg/kg)		note <sup>3</sup>	GW <sup>1</sup> Soil <sub>Class 3</sub> <sup>2</sup> (mg/kg)		note <sup>3</sup>	Alt <sup>1</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		note <sup>3</sup>	Alt <sup>1</sup> GW- Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		note <sup>3</sup>	Alt <sup>1</sup> GW- Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		note <sup>3</sup>	GW <sup>1</sup> Soil for Secondary MCL (mg/kg)		
Benzaldehyde	100-52-7	8.2E+03	n	1.1E+01	n	1.1E+03	n	—	—	—	—	8.2E+03	n	5.3E+00	n	5.3E+02	n	—	—	—	—	—	—
Benzene	71-43-2	1.2E+02	c	2.6E-02	m	2.6E+00	m	1.6E+02	c	9.2E+02	c	—	6.9E+01	c	1.3E-02	m	1.3E+00	m	8.4E+01	c	6.0E+01	c	—
Benzenediacarbonitrile, 1,3-	626-17-5	4.0E+02	n	3.3E-01	n	3.3E+01	n	—	—	—	—	4.0E+02	n	1.6E-01	n	1.6E+01	n	—	—	—	—	—	—
Benzenedicarboxylic acid, 1,2-disodecyl ester	26761-40-0	2.7E+03	n	1.0E+06	n >S	1.0E+06	n >S	1.0E+06	n	1.0E+06	n >S	2.6E+03	n	1.0E+06	n >S	1.0E+06	n >S	1.0E+06	n	1.0E+06	n >S	—	—
Benzenethiol	108-98-5	8.2E+01	n	6.8E-02	n	6.8E+00	n	—	—	—	—	8.2E+01	n	3.4E-02	n	3.4E+00	n	—	—	—	—	—	—
Benzidine	92-87-5	1.5E-02	c	1.1E-05	c	1.1E-03	c	6.3E-02	c	1.4E+01	c	—	1.3E-02	c	5.5E-06	c	5.5E-04	c	3.2E-02	c	1.2E+00	c	—
Benzo-a-pyrene	50-32-8	5.6E-01	c	7.6E+00	m	7.6E+02	m >S	8.5E+02	c	1.0E+06	c >S	—	5.6E-01	c	3.8E+00	m	3.8E+02	m >S	4.4E+02	c	9.6E+05	c >S	—
Benzo-b-fluoranthene	205-99-2	5.7E+00	c	6.0E+01	c	6.0E+03	c >S	6.1E+03	c	1.0E+06	c >S	—	5.7E+00	c	3.0E+01	c	3.0E+03	c >S	3.2E+03	c	1.0E+06	c >S	—
Benzo-e-pyrene	192-97-2	1.8E+03	n	1.1E+05	n >S	1.0E+06	n >S	—	—	—	—	1.8E+03	n	5.7E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—
Benzo-g,h,i-perylene	191-24-2	1.8E+03	n	4.6E+04	n >S	1.0E+06	n >S	—	—	—	—	1.8E+03	n	2.3E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—
Benzoic acid	65-85-0	2.7E+05	n	1.9E+02	n	1.9E+04	n >S	—	—	—	—	2.7E+05	n	9.5E+01	n	9.5E+03	n >S	—	—	—	—	—	—
Benzo-j-fluoranthene	205-82-3	5.4E+00	c	2.6E+01	c	2.6E+03	c >S	3.2E+03	c	1.0E+06	c >S	—	5.3E+00	c	1.3E+01	c	1.3E+03	c >S	1.7E+03	c	1.0E+06	c >S	—
Benzo-k-fluoranthene	207-08-9	5.7E+01	c	6.2E+02	c >S	6.2E+04	c >S	1.5E+05	c	1.0E+06	c >S	—	5.7E+01	c	3.1E+02	c >S	3.1E+04	c >S	7.8E+04	c	1.0E+06	c >S	—
Benzophenone	119-61-9	4.5E+02	n	1.7E+01	n	1.7E+03	n	—	—	—	—	4.5E+02	n	8.5E+00	n	8.5E+02	n	—	—	—	—	—	—
Benzotrithloride	98-07-7	3.6E-01	c	4.2E-03	c	4.2E-01	c	—	—	—	—	3.6E-01	c	2.1E-03	c	2.1E-01	c	—	—	—	—	—	—
Benzoyl peroxide	94-36-0	3.3E+03	n	5.4E+01	n	5.4E+03	n >S	—	—	—	—	3.3E+03	n	2.7E+01	n	2.7E+03	n >S	—	—	—	—	—	—
Benzyl alcohol	100-51-6	6.7E+03	n	5.9E+00	n	5.9E+02	n	—	—	—	—	6.7E+03	n	2.9E+00	n	2.9E+02	n	—	—	—	—	—	—
Benzyl chloride	100-44-7	2.6E+01	n	5.0E-02	c	5.0E+00	c	3.1E+01	n	9.3E+02	n	—	1.4E+01	n	2.5E-02	c	2.5E+00	c	1.6E+01	n	6.0E+01	n	—
Benzyl dichloride	98-87-3	2.8E+01	c	6.3E-02	c	6.3E+00	c	5.5E+01	n	2.3E+03	n	—	2.3E+01	n	3.2E-02	c	3.2E+00	c	2.8E+01	n	1.5E+02	n	—
Beryllium	7440-41-7	3.8E+01	n	1.8E+00	m >S	1.8E+02	m >S	—	—	—	—	3.8E+01	n	9.2E-01	m >S	9.2E+01	m >S	—	—	—	—	—	—
Biphenyl, 1,1'-	92-52-4	1.2E+04	n	2.5E+03	n >S	2.5E+05	n >S	—	—	—	—	1.2E+04	n	1.3E+03	n >S	1.3E+05	n >S	—	—	—	—	—	—
Biphenyl, 1,1'-, 2-phenoxy-	6738-04-1	3.2E+03	n	7.5E+04	n >S	1.0E+06	n >S	—	—	—	—	3.2E+03	n	3.7E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—
Biquinoline, 2,2'-	119-91-5	1.8E+02	n	2.7E+01	n	2.7E+03	n >S	—	—	—	—	1.8E+02	n	1.3E+01	n	1.3E+03	n >S	—	—	—	—	—	—
Bis (2-chloroethoxy) methane	111-91-1	3.1E+00	c	1.2E-02	c	1.2E+00	c	1.1E+01	c	1.1E+03	c	—	2.5E+00	c	5.9E-03	c	5.9E-01	c	5.8E+00	c	7.4E+01	c	—
Bis (2-chloroethyl) ether	111-44-4	2.2E+00	c	2.1E-03	c	2.1E-01	c	3.6E+00	c	2.4E+02	c	—	1.4E+00	c	1.1E-03	c	1.1E-01	c	1.8E+00	c	1.5E+01	c	—
Bis (2-chloroisopropyl) ether	108-60-1	5.1E+01	c	1.9E-01	c	1.9E+01	c	2.1E+02	c	1.3E+04	c	—	4.1E+01	c	9.5E-02	c	9.5E+00	c	1.1E+02	c	8.2E+02	c	—
Bis (2-chloromethyl) ether	542-88-1	4.8E-03	c	8.2E-06	c	8.2E-04	c	5.8E-03	c	1.7E-01	c	—	2.7E-03	c	4.1E-06	c	4.1E-04	c	3.0E-03	c	1.1E-02	c	—
Bis (2-ethyl-hexyl) phthalate	117-81-7	4.3E+01	c	1.6E+02	m	1.6E+04	m >S	—	—	—	—	4.3E+01	c	8.2E+01	m	8.2E+03	m >S	—	—	—	—	—	—
Bismuth	7440-69-9	3.7E+04	n	—	—	—	—	—	—	—	—	3.7E+04	n	—	—	—	—	—	—	—	—	—	—
Bisphenol A	80-05-7	3.3E+03	n	2.9E+01	n	2.9E+03	n	—	—	—	—	3.3E+03	n	1.5E+01	n	1.5E+03	n	—	—	—	—	—	—
Boron <sup>6</sup>	7440-42-8	1.6E+04	n	—	—	—	—	—	—	—	—	1.6E+04	n	—	—	—	—	—	—	—	—	—	—
Bromacil	314-40-9	6.7E+03	n	1.7E+01	n	1.7E+03	n	—	—	—	—	6.7E+03	n	8.6E+00	n	8.6E+02	n	—	—	—	—	—	—
Bromo-2-chloroethane, 1-	107-04-0	3.3E+03	n	3.5E+00	n	3.5E+02	n	—	—	—	—	3.3E+03	n	1.7E+00	n	1.7E+02	n	—	—	—	—	—	—
Bromobenzene	108-86-1	3.9E+02	n	2.3E+00	n	2.3E+02	n	9.7E+02	n	2.7E+04	n >S	—	2.8E+02	n	1.2E+00	n	1.2E+02	n	5.0E+02	n	1.7E+03	n	—
Bromodichloromethane	75-27-4	9.8E+01	c	6.5E-02	c	6.5E+00	c	—	—	—	—	9.8E+01	c	3.3E-02	c	3.3E+00	c	—	—	—	—	—	—
Bromoform	75-25-2	4.0E+02	c	6.3E-01	c	6.3E+01	c	8.4E+02	c	2.8E+04	c >S	—	2.8E+02	c	3.2E-01	c	3.2E+01	c	4.3E+02	c	1.8E+03	c	—
Bromomethane	74-83-9	4.6E+01	n	1.3E-01	n	1.3E+01	n	7.7E+01	n	1.8E+02	n	—	2.9E+01	n	6.5E-02	n	6.5E+00	n	3.9E+01	n	1.1E+01	n	—
Bromophenyl phenylether, 4-	101-55-3	2.8E-01	c	3.5E-01	c	3.5E+01	c	9.8E+00	c	9.2E+03	c >S	—	2.7E-01	c	1.8E-01	c	1.8E+01	c	5.0E+00	c	5.9E+02	c	—
Butadiene, 1,3-	106-99-0	5.1E+02	n	—	—	—	—	5.1E+02	n	5.0E+02	n	—	2.6E+02	n	—	—	—	2.6E+02	n	3.2E+01	n	—	—
Butadiene, 2-methyl-1,3- (isoprene)	78-79-5	4.8E+03	n	1.1E+01	n	1.1E+03	n	2.8E+05	n	6.2E+05	n >S	—	4.7E+03	n	5.5E+00	n	5.5E+02	n	1.4E+05	n	4.0E+04	n >S	—
Butanal (butyraldehyde)	123-72-8	1.2E+03	n	3.2E+00	n	3.2E+02	n	1.5E+03	n	4.3E+04	n	—	6.8E+02	n	1.6E+00	n	1.6E+02	n	7.9E+02	n	2.8E+03	n	—
Butane, 2,3-dimethyl-	79-29-8	4.8E+03	n	2.8E+02	n	2.8E+04	n >S	2.8E+05	n	4.6E+05	n >S	—	4.7E+03	n	1.4E+02	n	1.4E+04	n >S	1.4E+05	n	3.0E+04	n >S	—
Butanoic acid (butyric acid)	107-92-6	1.3E+02	n	2.3E+01	n	2.3E+03	n	1.3E+02	n	3.6E+04	n	—	6.6E+01	n	1.2E+01	n	1.2E+03	n	6.6E+01	n	2.4E+03	n	—
Butanol, 2-	78-92-2	1.5E+05	n	1.0E+02	n	1.0E+04	n	1.0E+06	n	1.0E+06	n >S	—	1.3E+05	n	5.2E+01	n	5.2E+03	n	7.2E+05	n	1.0E+06	n >S	—
Butanol, 2-methyl-1-	137-32-6	8.2E+02	n	6.0E-01	n	6.0E+01	n	—	—	—	—	8.2E+02	n	3.0E-01	n	3.0E+01	n	—	—	—	—	—	—
Butanol, 2-methyl-2-	75-85-4	8.2E+02	n	5.9E-01	n	5.9E+01	n	—	—	—	—	8.2E+02	n	2.9E-01	n	2.9E+01	n	—	—	—	—	—	—
Butanol, n-	71-36-3	8.2E+03	n	5.3E+00	n	5.3E+02	n	—	—	—	—	8.2E+03	n	2.6E+00	n	2.6E+02	n	—	—	—	—	—	—
Butene, 1-	106-98-9	4.6E+03	n	4.4E+01	n	4.4E+03	n	8.1E+04	n	8.8E+04	n >S	—	4.4E+03	n	2.2E+01	n	2.2E+03	n	4.2E+04	n	5.7E+03	n >S	—
Butene, cis-2-	590-18-1	4.1E+03	n	3.2E+01	n	3.2E+03	n	2.5E+04	n	2.8E+04	n >S	—	3.5E+03	n	1.6E+01	n	1.6E+03	n	1.3E+04	n	1.8E+03	n	—
Butene, trans-2-	624-64-6	4.1E+03	n	3.2E+01	n	3.2E+03	n	2.5E+04	n	2.8E+04	n >S	—	3.5E+03	n	1.6E+01	n	1.6E+03	n	1.3E+04	n	1.8E+03	n	—
Butoxy ethanol, 2- (Ethylene glycol monobutyl ether; EGBE)	111-76-2	6.5E+03	n	5.9E+00	n	5.9E+02	n	2.9E+05	n	1.0E+06	n >S	—	6.4E+03	n	2.9E+00	n	2.9E+02	n	1.5E+05	n	1.0E+06	n >S	—

**Last Revised: November 12, 2014**

11/30/2018

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area											
Chemical of Concern	CAS	Tot <sup>1</sup> Soil <sub>Comb</sub> <sup>2</sup> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Ing</sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	Air <sup>5</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	Air <sup>5</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil for Secondary MCL (mg/kg)	Tot <sup>1</sup> Soil <sub>Comb</sub> <sup>2</sup> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Ing</sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	Air <sup>5</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	Air <sup>5</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil for Secondary MCL (mg/kg)
Chlorophenyl phenylether, 4-	7005-72-3	1.6E-01	c	3.2E-02	c	3.2E+00	c	2.5E+00	c	6.5E+02	c	—	1.5E-01	c	1.6E-02	c	1.6E+00	c	1.3E+00	c	4.2E+01	c	—
Chloropropane, 2-	75-29-6	9.4E+02	n	5.4E+00	n	5.4E+02	n	1.5E+03	n	3.5E+03	n	—	6.0E+02	n	2.7E+00	n	2.7E+02	n	7.9E+02	n	2.2E+02	n	—
Chlorothalonil	1897-45-6	4.3E+02	c	8.1E+00	c	8.1E+02	c	—	—	—	—	—	4.3E+02	c	4.1E+00	c	4.1E+02	c	—	—	—	—	
Chlorotoluene, o- (2-chlorotoluene)	95-49-8	1.2E+03	n	9.1E+00	n	9.1E+02	n	1.3E+04	n	4.4E+05	n >S	—	1.1E+03	n	4.5E+00	n	4.5E+02	n	6.8E+03	n	2.8E+04	n >S	—
Chlorotoluene, p- (4-chlorotoluene)	106-43-4	1.6E+03	n	1.1E+01	n	1.1E+03	n	—	—	—	—	—	1.6E+03	n	5.4E+00	n	5.4E+02	n	—	—	—	—	
Chlorpyrifos	2921-88-2	1.3E+02	n	1.5E+01	n	1.5E+03	n >S	—	—	—	—	—	1.3E+02	n	7.4E+00	n	7.4E+02	n >S	—	—	—	—	
Chromium (III)	16065-83-1	3.3E+04	n	2.4E+03	m >S	2.4E+05	m >S	—	—	—	—	—	2.7E+04	n	1.2E+03	m >S	1.2E+05	m >S	—	—	—	—	
Chromium (total)	7440-47-3	3.3E+04	n	2.4E+03	m >S	2.4E+05	m >S	—	—	—	—	—	2.7E+04	n	1.2E+03	m >S	1.2E+05	m >S	—	—	—	—	
Chromium (VI)	18540-29-9	1.2E+02	n	2.8E+01	m >S	2.8E+03	m >S	—	—	—	—	—	1.2E+02	n	1.4E+01	m >S	1.4E+03	m >S	—	—	—	—	
Chrysene	218-01-9	5.6E+02	c	1.5E+03	c >S	1.5E+05	c >S	5.9E+05	c	1.0E+06	c >S	—	5.6E+02	c	7.7E+02	c >S	7.7E+04	c >S	3.0E+05	c	1.0E+06	c >S	—
Cobalt	7440-48-4	4.0E+02	n	2.2E+02	n >S	2.2E+04	n >S	—	—	—	—	—	3.7E+02	n	1.1E+02	n >S	1.1E+04	n >S	—	—	—	—	
Copolymer acrylamide	69418-26-4	1.3E+01	n	9.4E-03	n	9.4E-01	n	—	—	—	—	—	1.3E+01	n	4.7E-03	n	4.7E-01	n	—	—	—	—	
Copper	7440-50-8	1.3E+03	n	1.0E+03	e >S	1.0E+05	e >S	—	—	—	—	8.0E+02	1.3E+03	n	5.2E+02	e >S	5.2E+04	e >S	—	—	—	4.0E+02	
Coronene	191-07-1	1.3E+02	n	5.6E+04	n >S	1.0E+06	n >S	—	—	—	—	—	1.3E+02	n	2.8E+04	n >S	1.0E+06	n >S	—	—	—	—	
Coumaphos	56-72-4	4.3E+02	n	1.1E+02	n	1.1E+04	n >S	—	—	—	—	—	4.3E+02	n	5.5E+01	n	5.5E+03	n >S	—	—	—	—	
Cresol	1319-77-3	3.3E+03	n	6.6E+00	n	6.6E+02	n	—	—	—	—	—	3.3E+03	n	3.3E+00	n	3.3E+02	n	—	—	—	—	
Cresol, m- (3-methylphenol)	108-39-4	3.3E+03	n	6.6E+00	n	6.6E+02	n	—	—	—	—	—	3.3E+03	n	3.3E+00	n	3.3E+02	n	—	—	—	—	
Cresol, o- (2-methylphenol)	95-48-7	3.3E+03	n	7.1E+00	n	7.1E+02	n	—	—	—	—	—	3.3E+03	n	3.6E+00	n	3.6E+02	n	—	—	—	—	
Cresol, p- (4-methylphenol)	106-44-5	3.3E+02	n	6.3E-01	n	6.3E+01	n	—	—	—	—	—	3.3E+02	n	3.2E-01	n	3.2E+01	n	—	—	—	—	
Crotonaldehyde	123-73-9	3.2E+00	c	9.5E-04	c	9.5E-02	c	—	—	—	—	—	3.2E+00	c	4.8E-04	c	4.8E-02	c	—	—	—	—	
Cumene (isopropylbenzene)	98-82-8	4.3E+03	n	3.5E+02	n	3.5E+04	n >S	9.2E+03	n	6.2E+05	n >S	—	3.0E+03	n	1.7E+02	n	1.7E+04	n >S	4.8E+03	n	4.0E+04	n >S	—
Cyanazine	21725-46-2	5.6E+00	c	4.2E-03	c	4.2E-01	c	—	—	—	—	—	5.6E+00	c	2.1E-03	c	2.1E-01	c	—	—	—	—	
Cyanide	57-12-5	4.5E+01	n	4.0E+01	m	4.0E+03	m	7.2E+02	n	—	—	—	4.3E+01	n	2.0E+01	m	2.0E+03	m	3.7E+02	n	—	—	
Cyanogen	460-19-5	1.1E+01	n	6.1E-02	n	6.1E+00	n	1.2E+01	n	1.8E+01	n	—	5.9E+00	n	3.0E-02	n	3.0E+00	n	6.3E+00	n	1.2E+00	n	—
Cycloate	1134-23-2	3.7E+03	n	1.5E+02	n	1.5E+04	n >S	—	—	—	—	—	3.7E+03	n	7.6E+01	n	7.6E+03	n >S	—	—	—	—	
Cyclohexane	110-82-7	7.5E+04	n	5.9E+03	n >S	5.9E+05	n >S	9.2E+04	n	2.9E+05	n >S	—	4.2E+04	n	2.9E+03	n >S	2.9E+05	n >S	4.7E+04	n	1.8E+04	n >S	—
Cyclohexanol	108-93-0	3.3E+05	n	2.9E+02	n >S	2.9E+04	n >S	—	—	—	—	—	3.3E+05	n	1.5E+02	n >S	1.5E+04	n >S	—	—	—	—	
Cyclohexanone	108-94-1	3.2E+04	n	2.6E+02	n	2.6E+04	n	3.5E+04	n	1.0E+06	n >S	—	1.7E+04	n	1.3E+02	n	1.3E+04	n	1.8E+04	n	1.9E+05	n >S	—
Cyclohexene, 1-methanol-3-	1679-51-2	1.3E+03	n	3.8E+00	n	3.8E+02	n	—	—	—	—	—	1.3E+03	n	1.9E+00	n	1.9E+02	n	—	—	—	—	
Cyclohexene, 4-vinyl-1-	100-40-3	1.3E+03	n	3.1E+01	n	3.1E+03	n >S	5.1E+03	n	6.2E+04	n >S	—	1.1E+03	n	1.5E+01	n	1.5E+03	n >S	2.6E+03	n	4.0E+03	n >S	—
Cyclopentane	287-92-3	4.8E+03	n	2.8E+01	n	2.8E+03	n	3.7E+05	n	7.0E+05	n >S	—	4.8E+03	n	1.4E+01	n	1.4E+03	n	1.9E+05	n	4.6E+04	n >S	—
Cyclopentane, methyl-	96-37-7	5.3E+03	n	1.4E+02	n	1.4E+04	n >S	1.5E+04	n	3.8E+04	n >S	—	4.0E+03	n	6.8E+01	n	6.8E+03	n >S	7.9E+03	n	2.5E+03	n >S	—
Cyclopentene	142-29-0	4.1E+05	n	1.1E+03	n	1.1E+05	n >S	—	—	—	—	—	4.1E+05	n	5.3E+02	n	5.3E+04	n >S	—	—	—	—	
Cyclotetramethylenetetranitramine (HMX)	2691-41-0	1.6E+03	n	2.3E+00	n	2.3E+02	n	—	—	—	—	—	1.6E+03	n	1.2E+00	n	1.2E+02	n	—	—	—	—	
Cyclotrimethylenetrinitramine (RDX)	121-82-4	4.3E+01	c	3.7E-02	c	3.7E+00	c	—	—	—	—	—	4.3E+01	c	1.8E-02	c	1.8E+00	c	—	—	—	—	
Cymene (isopropyltoluene)	99-87-6	8.2E+03	n	2.3E+02	n	2.3E+04	n >S	—	—	—	—	—	8.2E+03	n	1.2E+02	n	1.2E+04	n >S	—	—	—	—	
Cymoxanil	57966-95-7	8.7E+02	n	6.1E-01	n	6.1E+01	n	—	—	—	—	—	8.7E+02	n	3.0E-01	n	3.0E+01	n	—	—	—	—	
Dacthal (DCPA)	1861-32-1	6.2E+02	n	4.5E+02	n >S	4.5E+04	n >S	—	—	—	—	—	6.2E+02	n	2.3E+02	n >S	2.3E+04	n >S	—	—	—	—	
Dalapon, sodium salt (2,2-dichloropropanoic acid)	75-99-0	2.0E+03	n	5.8E-01	m	5.8E+01	m	—	—	—	—	—	2.0E+03	n	2.9E-01	m	2.9E+01	m	—	—	—	—	
DDD	72-54-8	1.4E+01	c	1.3E+01	c	1.3E+03	c >S	—	—	—	—	—	1.4E+01	c	6.5E+00	c	6.5E+02	c >S	—	—	—	—	
DDE	72-55-9	1.0E+01	c	1.2E+01	c	1.2E+03	c >S	—	—	—	—	—	1.0E+01	c	5.9E+00	c	5.9E+02	c >S	—	—	—	—	
DDT	50-29-3	5.4E+00	c	1.5E+01	c	1.5E+03	c >S	1.2E+03	c	1.0E+06	c >S	—	5.4E+00	c	7.4E+00	c	7.4E+02	c >S	6.2E+02	c	2.2E+05	c >S	—
Demeton	8065-48-3	2.7E+00	n	1.2E-02	n	1.2E+00	n	—	—	—	—	—	2.7E+00	n	6.2E-03	n	6.2E-01	n	—	—	—	—	
Desethylatrazine	6190-65-4	2.3E+03	n	4.0E+00	n	4.0E+02	n	—	—	—	—	—	2.3E+03	n	2.0E+00	n	2.0E+02	n	—	—	—	—	
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	123-42-2	2.7E+03	n	1.9E+00	n	1.9E+02	n	—	—	—	—	—	2.7E+03	n	9.7E-01	n	9.7E+01	n	—	—	—	—	
Diallate	2303-16-4	3.8E+01	c	1.2E+00	c	1.2E+02	c	—	—	—	—	—	3.8E+01	c	5.8E-01	c	5.8E+01	c	—	—	—	—	
Diazinon	333-41-5	3.1E+01	n	1.6E-01	n	1.6E+01	n	6.5E+01	n	2.9E+04	n >S	—	2.1E+01	n	7.9E-02	n	7.9E+00	n	3.3E+01	n	1.9E+03	n >S	—
Dibenz(a,h)acridine	226-36-8	3.7E+00	c	5.8E+01	c >S	5.8E+03	c >S	1.5E+04	c	1.0E+06	c >S	—	3.7E+00	c	2.9E+01	c >S	2.9E+03	c >S	7.9E+03	c	1.0E+06	c >S	—
Dibenz(a,j)acridine	224-42-0	5.8E+00	c	1.1E+02	c >S	1.1E+04	c >S	2.1E+04	c	1.0E+06	c >S	—	5.8E+00	c	5.6E+01	c >S	5.6E+03	c >S	1.1E+04	c	1.0E+06	c >S	—
Dibenz-a,h-anthracene	53-70-3	5.5E-01	c	9.5E+00	c	9.5E+02	c >S	2.0E+03	c	1.0E+06	c >S	—	5.5E-01	c	4.8E+00	c	4.8E+02	c >S	1.0E+03	c	1.0E+06	c >S	—
Dibenzo(a,e)pyrene	192-65-4	6.1E-01	c	1.3E+02	c >S	1.3E+04	c >S	7.2E+03	c	1.0E+06	c >S	—	6.1E-01	c	6.5E+01	c >S	6.5E+03	c >S	3.7E+03	c	1.0E+06	c >S	—

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area											
Chemical of Concern	CAS	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg)	note <sup>3</sup>	GWSoil <sub>Ing</sub> (mg/kg)	note <sup>3</sup>	GWSoil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	AirSoil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	AirGW- Soil <sub>Inh-V</sub> (mg/kg)	note <sup>3</sup>	GWSoil for Secondary MCL (mg/kg)	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg)	note <sup>3</sup>	GWSoil <sub>Ing</sub> (mg/kg)	note <sup>3</sup>	GWSoil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	AirSoil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	AirGW- Soil <sub>Inh-V</sub> (mg/kg)	note <sup>3</sup>	GWSoil for Secondary MCL (mg/kg)
Dibenzo(a,h)pyrene	189-64-0	6.1E-02	c	1.2E+01	c	1.2E+03	c >S	7.0E+02	c	1.0E+06	c >S	—	6.1E-02	c	6.0E+00	c	6.0E+02	c >S	3.6E+02	c	1.0E+06	c >S	—
Dibenzo(a,i)pyrene	189-55-9	6.1E-02	c	1.2E+01	c	1.2E+03	c >S	7.0E+02	c	1.0E+06	c >S	—	6.1E-02	c	6.0E+00	c	6.0E+02	c >S	3.6E+02	c	1.0E+06	c >S	—
Dibenzofuran	132-64-9	2.7E+02	n	3.3E+01	n	3.3E+03	n >S	—	—	—	—	—	2.7E+02	n	1.7E+01	n	1.7E+03	n >S	—	—	—	—	—
Dibenzothiophene	132-65-0	4.4E+02	n	3.4E+02	n >S	3.4E+04	n >S	—	—	—	—	—	4.4E+02	n	1.7E+02	n >S	1.7E+04	n >S	—	—	—	—	—
Dibromo-3-chloropropane, 1,2-	96-12-8	1.5E-01	c	1.7E-03	m	1.7E-01	m	1.6E-01	c	5.4E+00	c	—	8.0E-02	c	8.7E-04	m	8.7E-02	m	8.1E-02	c	3.5E-01	c	—
Dibromochloromethane (chlorodibromomethane)	124-48-1	7.2E+01	c	4.9E-02	c	4.9E+00	c	—	—	—	—	—	7.2E+01	c	2.5E-02	c	2.5E+00	c	—	—	—	—	—
Dibromofluoromethane	1868-53-7	1.6E+04	n	1.6E+01	n	1.6E+03	n	—	—	—	—	—	1.6E+04	n	7.8E+00	n	7.8E+02	n	—	—	—	—	—
Dicamba	1918-00-9	2.0E+03	n	1.5E+00	n	1.5E+02	n	—	—	—	—	—	2.0E+03	n	7.3E-01	n	7.3E+01	n	—	—	—	—	—
Dichlormid	37764-25-3	1.7E+03	n	2.6E+00	n	2.6E+02	n	—	—	—	—	—	1.7E+03	n	1.3E+00	n	1.3E+02	n	—	—	—	—	—
Dichloro-2-butene, 1,4-	764-41-0	2.0E-01	c	—	—	—	—	2.0E-01	c	6.2E+00	c	—	1.0E-01	c	—	—	—	—	1.0E-01	c	4.0E-01	c	—
Dichloro-2-butene, 1,4- trans	110-57-6	2.0E-01	c	—	—	—	—	2.0E-01	c	6.6E+00	c	—	1.1E-01	c	—	—	—	—	1.1E-01	c	4.3E-01	c	—
Dichlorobenzene, 1,2-	95-50-1	7.2E+02	n	1.8E+01	m	1.8E+03	m	8.0E+02	n	3.5E+04	n >S	—	3.9E+02	n	8.9E+00	m	8.9E+02	m	4.1E+02	n	2.2E+03	n	—
Dichlorobenzene, 1,3-	541-73-1	1.2E+02	n	6.7E+00	n	6.7E+02	n	1.2E+02	n	1.7E+03	n >S	—	6.2E+01	n	3.4E+00	n	3.4E+02	n	6.3E+01	n	1.1E+02	n	—
Dichlorobenzene, 1,4-	106-46-7	2.5E+02	c	2.1E+00	m	2.1E+02	m	1.2E+04	n	4.8E+05	n >S	—	2.5E+02	c	1.1E+00	m	1.1E+02	m	6.1E+03	n	3.1E+04	n >S	—
Dichlorobenzidine, 3,3'-	91-94-1	1.0E+01	c	6.3E-02	c	6.3E+00	c	—	—	—	—	—	1.0E+01	c	3.1E-02	c	3.1E+00	c	—	—	—	—	—
Dichlorobutane, 2,3-	7581-97-7	9.5E+01	n	2.6E+00	n	2.6E+02	n	1.1E+02	n	1.5E+03	n	—	5.2E+01	n	1.3E+00	n	1.3E+02	n	5.5E+01	n	9.9E+01	n	—
Dichlorodifluoromethane	75-71-8	1.4E+03	n	2.4E+02	n	2.4E+04	n >S	1.5E+03	n	2.9E+03	n	—	7.5E+02	n	1.2E+02	n	1.2E+04	n >S	7.9E+02	n	1.9E+02	n	—
Dichloroethane, 1,1-	75-34-3	1.1E+04	n	1.8E+01	n	1.8E+03	n	3.7E+04	n	1.6E+05	n >S	—	8.8E+03	n	9.2E+00	n	9.2E+02	n	1.9E+04	n	1.1E+04	n >S	—
Dichloroethane, 1,2-	107-06-2	1.1E+01	c	1.4E-02	m	1.4E+00	m	1.4E+01	c	9.1E+01	c	—	6.4E+00	c	6.9E-03	m	6.9E-01	m	7.1E+00	c	5.9E+00	c	—
Dichloroethylene, 1,1-	75-35-4	2.3E+03	n	5.0E-02	m	5.0E+00	m	5.2E+03	n	1.2E+04	n	—	1.6E+03	n	2.5E-02	m	2.5E+00	m	2.7E+03	n	7.7E+02	n	—
Dichloroethylene, cis-1,2-	156-59-2	1.4E+02	n	2.5E-01	m	2.5E+01	m	9.2E+02	n	4.4E+03	n	—	1.2E+02	n	1.2E-01	m	1.2E+01	m	4.7E+02	n	2.8E+02	n	—
Dichloroethylene, trans-1,2	156-60-5	5.9E+02	n	4.9E-01	m	4.9E+01	m	9.2E+02	n	3.8E+03	n	—	3.7E+02	n	2.5E-01	m	2.5E+01	m	4.7E+02	n	2.4E+02	n	—
Dichlorofluoromethane	75-43-4	1.6E+04	n	1.4E+01	n	1.4E+03	n	—	—	—	—	—	1.6E+04	n	7.1E+00	n	7.1E+02	n	—	—	—	—	—
Dichlorophenol, 2,3-	576-24-9	2.0E+02	n	5.4E-01	n	5.4E+01	n	—	—	—	—	—	2.0E+02	n	2.7E-01	n	2.7E+01	n	—	—	—	—	—
Dichlorophenol, 2,4-	120-83-2	2.0E+02	n	3.5E-01	n	3.5E+01	n	—	—	—	—	—	2.0E+02	n	1.8E-01	n	1.8E+01	n	—	—	—	—	—
Dichlorophenol, 2,5-	583-78-8	2.0E+02	n	5.0E-01	n	5.0E+01	n	—	—	—	—	—	2.0E+02	n	2.5E-01	n	2.5E+01	n	—	—	—	—	—
Dichlorophenol, 2,6-	87-65-0	6.7E+01	n	6.9E-02	n	6.9E+00	n	—	—	—	—	—	6.7E+01	n	3.4E-02	n	3.4E+00	n	—	—	—	—	—
Dichlorophenol, 3,4-	95-77-2	2.0E+02	n	2.0E+00	n	2.0E+02	n	—	—	—	—	—	2.0E+02	n	1.0E+00	n	1.0E+02	n	—	—	—	—	—
Dichlorophenol, 3,5-	591-35-5	2.0E+02	n	1.3E+00	n	1.3E+02	n	—	—	—	—	—	2.0E+02	n	6.6E-01	n	6.6E+01	n	—	—	—	—	—
Dichlorophenoxy, 2,4- butyric acid, 4- (2,4-DB)	94-82-6	5.3E+02	n	3.9E-01	n	3.9E+01	n	—	—	—	—	—	5.3E+02	n	1.9E-01	n	1.9E+01	n	—	—	—	—	—
Dichlorophenoxyacetic acid, 2,4- (2,4-D)	94-75-7	7.3E+02	n	2.6E+00	m	2.6E+02	m	—	—	—	—	—	7.3E+02	n	1.3E+00	m	1.3E+02	m	—	—	—	—	—
Dichloroprop (2-(2,4-dichlorophenoxy) propanoic acid)	120-36-5	6.7E+02	n	4.7E-01	n	4.7E+01	n	—	—	—	—	—	6.7E+02	n	2.3E-01	n	2.3E+01	n	—	—	—	—	—
Dichloropropane, 1,2-	78-87-5	6.1E+01	n	2.3E-02	m	2.3E+00	m	6.1E+01	n	5.3E+02	n	—	3.1E+01	n	1.1E-02	m	1.1E+00	m	3.2E+01	n	3.4E+01	n	—
Dichloropropane, 1,3-	142-28-9	3.6E+01	c	6.4E-02	c	6.4E+00	c	9.0E+01	c	1.8E+03	c	—	2.6E+01	c	3.2E-02	c	3.2E+00	c	4.6E+01	c	1.2E+02	c	—
Dichloropropane, 2,2-	594-20-7	6.1E+01	n	1.2E-01	c	1.2E+01	c	6.1E+01	n	5.1E+02	n	—	3.1E+01	n	6.0E-02	c	6.0E+00	c	3.2E+01	n	3.3E+01	n	—
Dichloropropanol, 2,3-	616-23-9	2.0E+02	n	2.4E-01	n	2.4E+01	n	—	—	—	—	—	2.0E+02	n	1.2E-01	n	1.2E+01	n	—	—	—	—	—
Dichloropropene, 1,1-	563-58-6	3.6E+01	c	1.3E-01	c	1.3E+01	c	9.0E+01	c	2.8E+02	c	—	2.6E+01	c	6.7E-02	c	6.7E+00	c	4.6E+01	c	1.8E+01	c	—
Dichloropropene, 1,3- (mixed isomers)	542-75-6	3.6E+01	c	3.9E-02	c	3.9E+00	c	9.0E+01	c	7.7E+02	c	—	2.6E+01	c	2.0E-02	c	2.0E+00	c	4.6E+01	c	5.0E+01	c	—
Dichloropropene, cis 1,3-	10061-01-5	8.0E+00	n	6.6E-03	c	6.6E-01	c	3.1E+02	n	2.7E+03	n	—	7.8E+00	n	3.3E-03	c	3.3E-01	c	1.6E+02	n	1.8E+02	n	—
Dichloropropene, trans 1,3-	10061-02-6	3.6E+01	c	3.6E-02	c	3.6E+00	c	9.0E+01	c	7.5E+02	c	—	2.6E+01	c	1.8E-02	c	1.8E+00	c	4.6E+01	c	4.8E+01	c	—
Dichlorvos	62-73-7	1.6E+01	c	4.9E+05	c	1.0E+06	c	1.0E+06	n	1.0E+06	n	—	1.6E+01	c	2.4E+05	c	1.0E+06	c	6.2E+05	n	1.0E+06	n	—
Dicrotophos (bidrin)	141-66-2	6.7E+00	n	4.7E-03	n	4.7E-01	n	—	—	—	—	—	6.7E+00	n	2.3E-03	n	2.3E-01	n	—	—	—	—	—
Dicyclopentadiene	77-73-6	6.6E+02	n	—	—	—	—	—	—	—	—	—	6.6E+02	n	—	—	—	—	—	—	—	—	—
Dieldrin	60-57-1	1.5E-01	c	4.9E-02	c	4.9E+00	c	3.2E+01	c	1.1E+05	c >S	—	1.5E-01	c	2.4E-02	c	2.4E+00	c	1.6E+01	c	7.0E+03	c >S	—
Diethanolamine	111-42-2	3.3E+01	n	2.3E-02	n	2.3E+00	n	—	—	—	—	—	3.3E+01	n	1.2E-02	n	1.2E+00	n	—	—	—	—	—
Diethyldithiocarbamate, sodium salt	148-18-5	2.2E+01	c	—	—	—	—	—	—	—	—	—	2.2E+01	c	—	—	—	—	—	—	—	—	—
Diethyl phthalate	84-66-2	5.3E+04	n	1.6E+02	n	1.6E+04	n >S	—	—	—	—	—	5.3E+04	n	7.8E+01	n	7.8E+03	n >S	—	—	—	—	—
Diethylene glycol	111-46-6	1.3E+05	n	9.4E+01	n	9.4E+03	n	—	—	—	—	—	1.3E+05	n	4.7E+01	n	4.7E+03	n	—	—	—	—	—
Diethylene glycol monobutyl ether	112-34-5	2.0E+01	n	1.6E+00	n	1.6E+02	n	2.0E+01	n	6.9E+03	n	—	1.0E+01	n	7.8E-01	n	7.8E+01	n	1.0E+01	n	4.4E+02	n	—
Diethylhexyl adipate	103-23-1	3.9E+03	c	6.1E+03	m >S	6.1E+05	m >S	—	—	—	—	—	3.9E+03	c	3.0E+03	m >S	3.0E+05	m >S	—	—	—	—	—
Diethylstilbestrol	56-53-1	7.1E-04	c	5.8E-04	c	5.8E-02	c	—	—	—	—	—	7.1E-04	c	2.9E-04	c	2.9E-02	c	—	—	—	—	—

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area												
Chemical of Concern	CAS	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	note <sup>2</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)	note <sup>2</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	note <sup>2</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)	note <sup>2</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)	note <sup>3</sup>	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	note <sup>2</sup>	
Diisobutylene (trimethyl-1-pentene, 2,4,4-)	107-39-1	1.9E+03	n	6.1E+02	n	6.1E+04	n >S	3.1E+03	n	9.5E+03	n >S	—	1.2E+03	n	3.0E+02	n	3.0E+04	n >S	1.6E+03	n	6.1E+02	n	—	—
Diisopropylbenzene, p-	100-18-5	6.7E+02	n	9.5E+01	n	9.5E+03	n >S	—	—	—	—	—	6.7E+02	n	4.7E+01	n	4.7E+03	n >S	—	—	—	—	—	—
Diisopropyl ether (2,2'-oxybis-propane)	108-20-3	4.6E+03	n	1.2E+01	n	1.2E+03	n	1.1E+04	n	9.6E+04	n >S	—	3.3E+03	n	6.0E+00	n	6.0E+02	n	5.5E+03	n	6.2E+03	n	—	—
Dimethenamid	87674-68-8	1.0E+03	n	1.0E+00	n	1.0E+02	n	—	—	—	—	—	1.0E+03	n	5.2E-01	n	5.2E+01	n	—	—	—	—	—	—
Dimethoate	60-51-5	1.3E+01	n	1.0E-02	n	1.0E+00	n	—	—	—	—	—	1.3E+01	n	5.1E-03	n	5.1E-01	n	—	—	—	—	—	—
Dimethoxybenzidine, 3,3'-	119-90-4	3.4E+02	c	2.8E-01	c	2.8E+01	c	—	—	—	—	—	3.4E+02	c	1.4E-01	c	1.4E+01	c	—	—	—	—	—	—
Dimethylphenethylamine, alpha, alpha-	122-09-8	1.3E+02	n	3.8E-01	n	3.8E+01	n	—	—	—	—	—	1.3E+02	n	1.9E-01	n	1.9E+01	n	—	—	—	—	—	—
Dimethyl phenol, 2,4-	105-67-9	1.3E+03	n	3.2E+00	n	3.2E+02	n	—	—	—	—	—	1.3E+03	n	1.6E+00	n	1.6E+02	n	—	—	—	—	—	—
Dimethylaminoazobenzene, p-	60-11-7	6.4E-01	n	1.1E+00	n	1.1E+02	n	—	—	—	—	—	6.4E-01	n	5.6E-01	n	5.6E+01	n	—	—	—	—	—	—
Dimethylbenz-a-anthracene, 7,12-	57-97-6	1.7E-02	c	1.2E+00	c	1.2E+02	c	1.4E+02	c	1.0E+06	c >S	—	1.7E-02	c	6.2E-01	c	6.2E+01	c	7.3E+01	c	7.3E+05	c >S	—	—
Dimethylbenzidine, 3,3'-	119-93-7	4.3E-01	c	8.2E-04	c	8.2E-02	c	—	—	—	—	—	4.3E-01	c	4.1E-04	c	4.1E-02	c	—	—	—	—	—	—
Dimethylnaphthalene, 1,3-	575-41-7	2.3E+03	n	7.9E+02	n	7.9E+04	n >S	—	—	—	—	—	2.3E+03	n	3.9E+02	n	3.9E+04	n >S	—	—	—	—	—	—
Dimethylphthalate	131-11-3	5.3E+04	n	6.2E+01	n	6.2E+03	n	—	—	—	—	—	5.3E+04	n	3.1E+01	n	3.1E+03	n	—	—	—	—	—	—
Di-n-butyl phthalate	84-74-2	6.2E+03	n	3.3E+03	n	3.3E+05	n >S	—	—	—	—	—	6.2E+03	n	1.7E+03	n	1.7E+05	n >S	—	—	—	—	—	—
Dinitro-2-methylphenol, 4,6- (dinitro-o-cresol, 4, 6-)	534-52-1	6.7E+00	n	4.7E-03	n	4.7E-01	n	—	—	—	—	—	6.7E+00	n	2.3E-03	n	2.3E-01	n	—	—	—	—	—	—
Dinitrobenzene, 1,3- (dinitrobenzene, 2,4- )	99-65-0	6.7E+00	n	7.6E-03	n	7.6E-01	n	—	—	—	—	—	6.7E+00	n	3.8E-03	n	3.8E-01	n	—	—	—	—	—	—
Dinitrobenzene, 1,4-	100-25-4	6.7E+00	n	7.2E-03	n	7.2E-01	n	—	—	—	—	—	6.7E+00	n	3.6E-03	n	3.6E-01	n	—	—	—	—	—	—
Dinitrophenol, 2,4-	51-28-5	1.3E+02	n	9.4E-02	n	9.4E+00	n	—	—	—	—	—	1.3E+02	n	4.7E-02	n	4.7E+00	n	—	—	—	—	—	—
Dinitrophenol, 2,5-	329-71-5	1.3E+02	n	9.6E-02	n	9.6E+00	n	—	—	—	—	—	1.3E+02	n	4.8E-02	n	4.8E+00	n	—	—	—	—	—	—
Dinitrotoluene, 2,4-	121-14-2	6.9E+00	c	5.3E-03	c	5.3E-01	c	—	—	—	—	—	6.9E+00	c	2.7E-03	c	2.7E-01	c	—	—	—	—	—	—
Dinitrotoluene, 2,6-	606-20-2	6.9E+00	c	4.8E-03	c	4.8E-01	c	—	—	—	—	—	6.9E+00	c	2.4E-03	c	2.4E-01	c	—	—	—	—	—	—
Di-n-octyl phthalate	117-84-0	6.4E+02	n	8.1E+05	n >S	1.0E+06	n >S	—	—	—	—	—	6.4E+02	n	4.1E+05	n >S	1.0E+06	n >S	—	—	—	—	—	—
Dinoseb	88-85-7	6.7E+01	n	3.5E-01	m	3.5E+01	m	—	—	—	—	—	6.7E+01	n	1.8E-01	m	1.8E+01	m	—	—	—	—	—	—
Dioxane 1,4-	123-91-1	4.5E+01	c	1.8E-02	c	1.8E+00	c	1.8E+02	c	1.5E+04	c	—	3.7E+01	c	8.8E-03	c	8.8E-01	c	9.3E+01	c	9.7E+02	c	—	—
Dioxin (as 2,3,7,8-TCDD toxicity equivalent quotients (TEQs))*	1746-01-6	1.0E-03	e	1.7E-02	m	1.7E+00	m	—	—	—	—	—	1.0E-03	e	8.5E-03	m	8.5E-01	m	—	—	—	—	—	—
Diphenyl ether	101-84-8	3.8E+02	n	9.2E+01	n	9.2E+03	n >S	—	—	—	—	—	3.8E+02	n	4.6E+01	n	4.6E+03	n >S	—	—	—	—	—	—
Diphenylamine	122-39-4	1.7E+03	n	9.6E+00	n	9.6E+02	n	—	—	—	—	—	1.7E+03	n	4.8E+00	n	4.8E+02	n	—	—	—	—	—	—
Diphenylhydrazine, 1,2-	122-66-7	5.6E+00	c	3.2E-02	c	3.2E+00	c	1.4E+02	c	1.1E+05	c >S	—	5.4E+00	c	1.6E-02	c	1.6E+00	c	7.2E+01	c	7.0E+03	c	—	—
Dipropylene glycol	110-98-5	8.0E+03	n	5.7E+00	n	5.7E+02	n	—	—	—	—	—	8.0E+03	n	2.8E+00	n	2.8E+02	n	—	—	—	—	—	—
Diquat	85-00-7	1.5E+02	n	2.0E-01	m	2.0E+01	m	—	—	—	—	—	1.5E+02	n	1.0E-01	m	1.0E+01	m	—	—	—	—	—	—
Disodium iminodiacetate (iminodiacetic acid, disodium salt)	142-73-4	6.7E+02	n	4.7E-01	n	4.7E+01	n	—	—	—	—	—	6.7E+02	n	2.3E-01	n	2.3E+01	n	—	—	—	—	—	—
Disulfoton	298-04-4	2.7E+00	n	3.5E-01	n	3.5E+01	n	—	—	—	—	—	2.7E+00	n	1.8E-01	n	1.8E+01	n	—	—	—	—	—	—
Diuron	330-54-1	1.3E+02	n	9.3E-01	n	9.3E+01	n	—	—	—	—	—	1.3E+02	n	4.6E-01	n	4.6E+01	n	—	—	—	—	—	—
Dodecylphenol, 4-	104-43-8	3.3E+03	n	1.0E+06	n >S	1.0E+06	n >S	—	—	—	—	—	3.3E+03	n	1.0E+06	n >S	1.0E+06	n >S	—	—	—	—	—	—
Endosulfan	115-29-7	4.0E+02	n	4.6E+00	n	4.6E+02	n >S	—	—	—	—	—	4.0E+02	n	2.3E+00	n	2.3E+02	n >S	—	—	—	—	—	—
Endosulfan I	959-98-8	9.1E+01	n	3.1E+01	n	3.1E+03	n >S	—	—	—	—	—	9.1E+01	n	1.5E+01	n	1.5E+03	n >S	—	—	—	—	—	—
Endosulfan II	33213-65-9	2.7E+02	n	9.2E+01	n	9.2E+03	n >S	—	—	—	—	—	2.7E+02	n	4.6E+01	n	4.6E+03	n >S	—	—	—	—	—	—
Endosulfan sulfate	1031-07-8	3.8E+02	n	4.7E+03	n >S	4.7E+05	n >S	—	—	—	—	—	3.8E+02	n	2.3E+03	n >S	2.3E+05	n >S	—	—	—	—	—	—
Endothall	145-73-3	1.3E+03	n	5.3E-01	m	5.3E+01	m	—	—	—	—	—	1.3E+03	n	2.7E-01	m	2.7E+01	m	—	—	—	—	—	—
Endrin	72-20-8	9.0E+00	n	7.5E-01	m	7.5E+01	m	—	—	—	—	—	9.0E+00	n	3.8E-01	m	3.8E+01	m	—	—	—	—	—	—
Endrin aldehyde	7421-93-4	1.9E+01	n	6.3E+02	n	6.3E+04	n >S	—	—	—	—	—	1.9E+01	n	3.1E+02	n	3.1E+04	n >S	—	—	—	—	—	—
Endrin ketone	53494-70-5	1.9E+01	n	5.1E+01	n	5.1E+03	n	—	—	—	—	—	1.9E+01	n	2.5E+01	n	2.5E+03	n	—	—	—	—	—	—
Epichlorohydrin	106-89-8	2.5E+01	n	1.8E-01	c	1.8E+01	c	2.6E+01	n	1.4E+03	n	—	1.3E+01	n	9.2E-02	c	9.2E+00	c	1.4E+01	n	9.1E+01	n	—	—
EPN (o-ethyl o-(4-nitrophenyl)phenylphosphonothioate)	2104-64-5	6.7E-01	n	5.5E-02	n	5.5E+00	n	—	—	—	—	—	6.7E-01	n	2.7E-02	n	2.7E+00	n	—	—	—	—	—	—
Esfenvalerate	66230-04-4	7.4E+01	n	1.2E+02	n >S	1.2E+04	n >S	—	—	—	—	—	7.4E+01	n	6.2E+01	n >S	6.2E+03	n >S	—	—	—	—	—	—
Ethalfuralin (sonolan)	55283-68-6	4.7E+01	c	2.5E+01	c	2.5E+03	c	—	—	—	—	—	4.7E+01	c	1.2E+01	c	1.2E+03	c	—	—	—	—	—	—
Ethanol	64-17-5	1.0E+06	n	1.6E+03	n	1.6E+05	n	—	—	—	—	—	1.0E+06	n	1.2E+02	n	1.2E+04	n	—	—	—	—	—	—
Ethanol, 2-amino-	141-43-5	1.1E+02	n	8.0E-02	n	8.0E+00	n	—	—	—	—	—	1.1E+02	n	4.0E-02	n	4.0E+00	n	—	—	—	—	—	—
Ethanol, 2-(2-aminoethoxy)-	929-06-6	3.3E+01	n	2.3E-02	n	2.3E+00	n	—	—	—	—	—	3.3E+01	n	1.2E-02	n	1.2E+00	n	—	—	—	—	—	—
Ethanol, 2-(2-ethoxyethoxy)-	111-90-0	1.3E+05	n	1.6E+02	n	1.6E+04	n	—	—	—	—	—	1.3E+05	n	8.2E+01	n	8.2E+03	n	—	—	—	—	—	—

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area																																																																																																																																																																																																																																																																																																																																																													
Chemical of Concern		CAS	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)		note <sup>2</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)		note <sup>2</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)		note <sup>3</sup>	<sup>1&lt;/</sup>	

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

Last Revised: November 12, 2014

		0.5 acre source area										30 acre source area														
Chemical of Concern		CAS	Tot <sup>1</sup> Soil <sub>Comb</sub> <sup>2</sup> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Ing</sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	Ar <sup>5</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)	note <sup>3</sup>	Ar <sup>5</sup> GW- Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil for Secondary MCL (mg/kg)	Tot <sup>1</sup> Soil <sub>Comb</sub> <sup>2</sup> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Ing</sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil <sub>Class 3</sub> (mg/kg)	note <sup>3</sup>	Ar <sup>5</sup> Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)	note <sup>3</sup>	Ar <sup>5</sup> GW- Soil <sub>I<sub>inh-V</sub></sub> (mg/kg)	note <sup>3</sup>	GW <sup>4</sup> Soil for Secondary MCL (mg/kg)		
Hexachloroethane	67-72-1	4.6E+01	n	1.3E+00	n	1.3E+02	n	5.0E+03	n	5.5E+05	n	>S	—	4.6E+01	n	6.4E-01	n	6.4E+01	n	2.5E+03	n	3.6E+04	n	>S	—	
Hexachlorophene	70-30-4	2.0E+01	n	5.9E+03	n	>S	5.9E+05	n	>S	—	—	—	—	2.0E+01	n	2.9E+03	n	>S	2.9E+05	n	>S	—	—	—	—	
Hexachloropropylene	1888-71-7	6.7E+01	n	1.0E+01	n	1.0E+03	n	9.9E+02	c	1.8E+05	c	>S	—	6.7E+01	n	5.2E+00	n	5.2E+02	n	5.1E+02	c	1.2E+04	c	>S	—	
Hexanal, 2-ethyl-	123-05-7	1.0E+04	n	2.6E+01	n	2.6E+03	n	—	—	—	—	—	—	1.0E+04	n	1.3E+01	n	1.3E+03	n	—	—	—	—	—	—	
Hexane, n-	110-54-3	3.3E+03	n	2.0E+02	n	2.0E+04	n	>S	1.0E+04	n	5.3E+03	n	>S	—	2.5E+03	n	1.0E+02	n	1.0E+04	n	>S	5.3E+03	n	3.4E+02	n	—
Hexanediamine, 1,6-	124-09-4	3.3E+02	n	2.5E-01	n	2.5E+01	n	—	—	—	—	—	—	3.3E+02	n	1.2E-01	n	1.2E+01	n	—	—	—	—	—	—	
Hexanedinitrile	111-69-3	8.5E+01	n	6.8E-02	n	6.8E+00	n	9.8E+02	n	3.2E+05	n	—	—	7.9E+01	n	3.4E-02	n	3.4E+00	n	5.1E+02	n	2.1E+04	n	—	—	
Hexanediol, 1,6-	629-11-8	3.0E+05	n	2.6E+02	n	2.6E+04	n	1.0E+06	n	1.0E+06	n	>S	—	2.8E+05	n	1.3E+02	n	1.3E+04	n	1.0E+06	n	1.0E+06	n	>S	—	
Hexanoic acid	142-62-1	1.3E+02	n	3.0E+00	n	3.0E+02	n	1.4E+02	n	4.0E+04	n	>S	—	6.9E+01	n	1.5E+00	n	1.5E+02	n	7.0E+01	n	2.6E+03	n	—	—	
Hexanone, 2-	591-78-6	2.7E+02	n	3.2E-01	n	3.2E+01	n	8.3E+02	n	3.0E+04	n	—	—	2.1E+02	n	1.6E-01	n	1.6E+01	n	4.2E+02	n	2.0E+03	n	—	—	
Hexazinone	51235-04-2	2.2E+03	n	2.7E+00	n	2.7E+02	n	—	—	—	—	—	—	2.2E+03	n	1.4E+00	n	1.4E+02	n	—	—	—	—	—	—	
Hexene, 1-	592-41-6	1.6E+03	n	7.4E+02	n	7.4E+04	n	>S	1.7E+03	n	3.1E+03	n	>S	—	8.4E+02	n	3.7E+02	n	3.7E+04	n	>S	8.7E+02	n	2.0E+02	n	—
Hexene, cis-2-	7688-21-3	1.6E+03	n	6.2E+02	n	6.2E+04	n	>S	1.7E+03	n	3.7E+03	n	>S	—	8.4E+02	n	3.1E+02	n	3.1E+04	n	>S	8.7E+02	n	2.4E+02	n	—
Hexylene glycol (2-methyl-2,4-pentanediol)	107-41-5	2.0E+04	n	1.5E+01	n	1.5E+03	n	—	—	—	—	—	—	2.0E+04	n	7.4E+00	n	7.4E+02	n	—	—	—	—	—	—	
Hydrazine	302-01-2	3.8E-01	c	5.8E-04	c	5.8E-02	c	4.6E-01	c	9.8E+01	c	—	—	2.1E-01	c	2.9E-04	c	2.9E-02	c	2.4E-01	c	6.4E+00	c	—	—	
Hydrocaproic acid, 6- (6-hydroxyhexanoic acid)	1191-25-9	1.6E+02	n	3.0E+00	n	3.0E+02	n	1.6E+02	n	5.6E+04	n	>S	—	8.1E+01	n	1.5E+00	n	1.5E+02	n	8.3E+01	n	4.1E+03	n	—	—	
Hydrogen chloride (hydrochloric acid)*	7647-01-0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Hydroquinone	123-31-9	7.8E+01	c	3.1E-02	c	3.1E+00	c	—	—	—	—	—	—	7.8E+01	c	1.6E-02	c	1.6E+00	c	—	—	—	—	—	—	
Indene	95-13-6	1.0E+02	n	7.1E+00	n	7.1E+02	n	1.1E+02	n	4.0E+03	n	—	—	5.6E+01	n	3.6E+00	n	3.6E+02	n	5.8E+01	n	2.6E+02	n	—	—	
Indeno-1,2,3-cd-pyrene	193-39-5	5.7E+00	c	1.7E+02	c	1.7E+04	c	>S	2.5E+04	c	1.0E+06	c	>S	—	5.7E+00	c	8.7E+01	c	8.7E+03	c	>S	1.3E+04	c	1.0E+06	c	>S
Iron*	7439-89-6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Isoamyl alcohol	123-51-3	4.1E+02	n	3.2E-01	n	3.2E+01	n	—	—	—	—	—	—	4.1E+02	n	1.6E-01	n	1.6E+01	n	—	—	—	—	—	—	
Isobutyl alcohol	78-83-1	2.5E+04	n	1.6E+01	n	1.6E+03	n	—	—	—	—	—	—	2.5E+04	n	7.9E+00	n	7.9E+02	n	—	—	—	—	—	—	
Isobutylene (2-methyl-1-propene)	115-11-7	3.0E+02	n	2.7E+00	n	2.7E+02	n	1.0E+06	n	1.0E+06	n	>S	—	3.0E+02	n	1.4E+00	n	1.4E+02	n	8.7E+05	n	1.2E+05	n	>S	—	
Isobutyric acid (2-methylpropanoic acid)	79-31-2	3.3E+04	n	2.3E+01	n	2.3E+03	n	—	—	—	—	—	—	3.3E+04	n	1.2E+01	n	1.2E+03	n	—	—	—	—	—	—	
Isodecanol	25339-17-7	7.1E+01	n	3.0E+00	n	3.0E+02	n	—	—	—	—	—	—	7.1E+01	n	1.5E+00	n	1.5E+02	n	—	—	—	—	—	—	
Isodrin	465-73-6	2.7E-02	c	1.5E+00	c	1.5E+02	c	1.7E+00	c	9.4E+03	c	>S	—	2.7E-02	c	7.4E-01	c	7.4E+01	c	9.0E-01	c	6.1E+02	c	—	—	
Isopentane	78-78-4	4.8E+03	n	2.7E+02	n	2.7E+04	n	>S	3.7E+05	n	4.5E+05	n	>S	—	4.8E+03	n	1.3E+02	n	1.3E+04	n	>S	1.9E+05	n	2.9E+04	n	>S
Isophorone	78-59-1	4.9E+03	c	3.0E+00	c	3.0E+02	c	—	—	—	—	—	—	4.9E+03	c	1.5E+00	c	1.5E+02	c	—	—	—	—	—	—	
Isopropyl acetate	108-21-4	5.7E+03	n	4.0E+00	n	4.0E+02	n	—	—	—	—	—	—	5.7E+03	n	2.0E+00	n	2.0E+02	n	—	—	—	—	—	—	
Isopropyl alcohol	67-63-0	1.6E+04	n	1.0E+01	n	1.0E+03	n	—	—	—	—	—	—	1.6E+04	n	5.0E+00	n	5.0E+02	n	—	—	—	—	—	—	
Isosafrole	120-58-1	1.7E+01	c	1.3E-01	c	1.3E+01	c	9.1E+01	c	1.3E+04	c	>S	—	1.5E+01	c	6.5E-02	c	6.5E+00	c	4.7E+01	c	8.6E+02	c	—	—	
Kelthane (dicofol)	115-32-2	2.7E+02	n	7.4E+01	n	7.4E+03	n	>S	—	—	—	—	—	2.7E+02	n	3.7E+01	n	3.7E+03	n	>S	—	—	—	—	—	
Kepone (chlordecone)	143-50-0	3.6E-01	c	9.9E-02	c	9.9E+00	c	4.9E+01	c	2.5E+05	c	>S	—	3.5E-01	c	4.9E-02	c	4.9E+00	c	2.5E+01	c	1.6E+04	c	>S	—	
Lead (inorganic)	7439-92-1	5.0E+02	n	3.0E+00	e	>S	3.0E+02	e	>S	—	—	—	—	5.0E+02	n	1.5E+00	e	>S	1.5E+02	e	>S	—	—	—	—	
Leptophos	21609-90-5	1.6E-01	n	6.4E-01	n	6.4E+01	n	>S	3.3E+01	n	3.4E+05	n	>S	—	1.6E-01	n	3.2E-01	n	3.2E+01	n	>S	1.7E+01	n	2.2E+04	n	>S
Limonene, d-*	5989-27-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Lithium <sup>6</sup>	7439-93-2	1.3E+02	n	—	—	—	—	—	—	—	—	—	—	1.3E+02	n	—	—	—	—	—	—	—	—	—	—	
Magnesium*	7439-95-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Malathion	121-75-5	1.7E+02	n	6.6E+00	n	6.6E+02	n	2.0E+02	n	1.2E+05	n	>S	—	9.6E+01	n	3.3E+00	n	3.3E+02	n	1.0E+02	n	8.0E+03	n	>S	—	
Maleic anhydride	108-31-6	6.7E+03	n	7.2E+00	n	7.2E+02	n	—	—	—	—	—	—	6.7E+03	n	3.6E+00	n	3.6E+02	n	—	—	—	—	—	—	
Maleic hydrazide	123-33-1	3.3E+04	n	3.6E+01	n	3.6E+03	n	—	—	—	—	—	—	3.3E+04	n	1.8E+01	n	1.8E+03	n	—	—	—	—	—	—	
Malononitrile	109-77-3	6.7E+00	n	5.2E-03	n	5.2E-01	n	—	—	—	—	—	—	6.7E+00	n	2.6E-03	n	2.6E-01	n	—	—	—	—	—	—	
Mancozeb	8018-01-7	2.0E+03	n	1.8E+00	n	1.8E+02	n	>S	—	—	—	—	—	2.0E+03	n	9.0E-01	n	9.0E+01	n	>S	—	—	—	—	—	
Manganese	7439-96-5	3.9E+03	n	3.4E+03	n	>S	3.4E+05	n	>S	—	—	—	5.0E+01	3.8E+03	n	1.7E+03	n	>S	1.7E+05	n	>S	—	—	—	2.5E+01	
MCPA (4-(chloro-2-methylphenoxy) acetic acid)	94-74-6	3.3E+01	n	2.3E-02	n	2.3E+00	n	—	—	—	—	—	—	3.3E+01	n	1.2E-02	n	1.2E+00	n	—	—	—	—	—	—	
MCPP (2-(4-chloro-2-methylphenoxy) propanoic acid)	93-65-2	6.7E+01	n	4.7E-02	n	4.7E+00	n	—	—	—	—	—	—	6.7E+01	n	2.3E-02	n	2.3E+00	n	—	—	—	—	—	—	
Mercuric chloride (pH = 4.9) <sup>7</sup>	7487-94-7	3.6E+00	n	7.8E-03	m	7.8E-01	m	>S	4.6E+00	n	2.8E+01	n	>S	—	2.1E+00	n	3.9E-03	m	3.9E-01	m	>S	2.4E+00	n	1.8E+00	n	>S
Mercuric chloride (pH = 6.8) <sup>7</sup>	7487-94-7	8.3E+00	n	2.1E+00	m	2.1E+02	m	>S	1.6E+01	n	7.6E+03	n	>S	—	5.5E+00	n	1.0E+00	m	1.0E+02	m	>S	8.0E+00	n	4.9E+02	n	>S
Mercury (pH = 4.9)<																										

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area																
Chemical of Concern		CAS		Total Soil <sub>Comb</sub> <sup>2</sup> (mg/kg) note <sup>3</sup>		GW Soil <sub>Ing</sub> (mg/kg) note <sup>3</sup>		GW Soil <sub>Class 3</sub> (mg/kg) note <sup>3</sup>		Air Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg) note <sup>3</sup>		Air/GW- Soil <sub>Inh-V</sub> (mg/kg) note <sup>3</sup>		GW Soil for Secondary MCL (mg/kg)		Total Soil <sub>Comb</sub> <sup>2</sup> (mg/kg) note <sup>3</sup>		GW Soil <sub>Ing</sub> (mg/kg) note <sup>3</sup>		GW Soil <sub>Class 3</sub> (mg/kg) note <sup>3</sup>		Air Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg) note <sup>3</sup>		Air/GW- Soil <sub>Inh-V</sub> (mg/kg) note <sup>3</sup>		GW Soil for Secondary MCL (mg/kg)		
Merphos	150-50-5	2.0E+00	n	6.5E+00	n	6.5E+02	n >S	—	—	—	—	—	—	2.0E+00	n	3.2E+00	n	3.2E+02	n >S	—	—	—	—	—	—	—	—	—
Methacrylic acid (2-methyl-2-propenoic acid)	79-41-4	8.2E+02	n	4.7E-01	n	4.7E+01	n	—	—	—	—	—	—	8.2E+02	n	2.3E-01	n	2.3E+01	n	—	—	—	—	—	—	—	—	—
Methacrylonitrile	126-98-7	5.1E+02	n	2.5E+00	n	2.5E+02	n	5.8E+02	n	2.3E+04	n	—	—	2.8E+02	n	1.3E+00	n	1.3E+02	n	3.0E+02	n	1.5E+03	n	n	—	—	—	—
Methanol	67-56-1	1.1E+05	n	9.4E+01	n	9.4E+03	n	3.3E+05	n	1.0E+06	n >S	—	—	8.3E+04	n	4.7E+01	n	4.7E+03	n	1.7E+05	n	9.6E+05	n >S	n	—	—	—	—
Methapyrilene	91-80-5	1.0E+00	c	5.3E-04	c	5.3E-02	c	—	—	—	—	—	—	1.0E+00	c	2.6E-04	c	2.6E-02	c	—	—	—	—	—	—	—	—	
Methomyl	16752-77-5	1.7E+03	n	5.1E+00	n	5.1E+02	n	—	—	—	—	—	—	1.7E+03	n	2.5E+00	n	2.5E+02	n	—	—	—	—	—	—	—	—	
Methoxychlor	72-43-5	2.7E+02	n	1.2E+02	m	1.2E+04	m >S	—	—	—	—	—	—	2.7E+02	n	6.2E+01	m	6.2E+03	m >S	—	—	—	—	—	—	—	—	
Methoxyethanol, 2-	109-86-4	2.7E+02	n	3.6E+00	n	3.6E+02	n >S	3.1E+02	n	4.5E+02	n >S	—	—	1.5E+02	n	1.8E+00	n	1.8E+02	n >S	1.6E+02	n	2.9E+01	n	n	—	—	—	
Methyl acetate (acetic acid, methyl ester)	79-20-9	8.2E+04	n	4.9E+01	n	4.9E+03	n	—	—	—	—	—	—	8.2E+04	n	2.4E+01	n	2.4E+03	n	—	—	—	—	—	—	—	—	
Methyl acrylate	96-33-3	1.1E+02	n	1.0E-01	n	1.0E+01	n	3.1E+02	n	5.7E+03	n	—	—	8.0E+01	n	5.2E-02	n	5.2E+00	n	1.6E+02	n	3.7E+02	n	n	—	—	—	
Methyl amyl ketone (2-heptanone)	110-43-0	3.9E+03	n	4.7E+00	n	4.7E+02	n	1.1E+05	n	1.0E+06	n >S	—	—	3.8E+03	n	2.4E+00	n	2.4E+02	n	5.7E+04	n	2.8E+05	n >S	n	—	—	—	
Methyl chrysene, 1-	3351-28-8	5.8E+02	c	2.2E+04	c >S	1.0E+06	c >S	1.0E+06	c	1.0E+06	c >S	—	—	5.8E+02	c	1.1E+04	c >S	1.0E+06	c >S	1.0E+06	c	1.0E+06	c >S	c	—	—	—	
Methyl chrysene, 2-	3351-32-4	5.8E+02	c	2.2E+04	c >S	1.0E+06	c >S	1.0E+06	c	1.0E+06	c >S	—	—	5.8E+02	c	1.1E+04	c >S	1.0E+06	c >S	1.0E+06	c	1.0E+06	c >S	c	—	—	—	
Methyl chrysene, 6-	1705-85-7	5.7E+01	c	1.8E+03	c >S	1.8E+05	c >S	2.3E+05	c	1.0E+06	c >S	—	—	5.7E+01	c	8.8E+02	c >S	8.8E+04	c >S	1.2E+05	c	1.0E+06	c >S	—	—	—	—	
Methyl cyclohexane	108-87-2	4.1E+04	n	1.6E+04	n >S	1.0E+06	n >S	4.6E+04	n	1.8E+05	n >S	—	—	2.2E+04	n	7.8E+03	n >S	7.8E+05	n >S	2.4E+04	n	1.2E+04	n >S	n	—	—	—	
Methyl ethyl ketone (2-butanone)	78-93-3	4.0E+04	n	2.9E+01	n	2.9E+03	n	2.0E+05	n	1.0E+06	n >S	—	—	3.3E+04	n	1.5E+01	n	1.5E+03	n	1.0E+05	n	6.2E+05	n >S	n	—	—	—	
Methyl iodide (iodomethane)	74-88-4	1.1E+02	n	1.1E-01	n	1.1E+01	n	—	—	—	—	—	—	1.1E+02	n	5.7E-02	n	5.7E+00	n	—	—	—	—	—	—	—		
Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	5.9E+03	n	4.9E+00	n	4.9E+02	n	5.8E+04	n	1.0E+06	n >S	—	—	5.4E+03	n	2.5E+00	n	2.5E+02	n	3.0E+04	n	1.1E+05	n >S	n	—	—	—	
Methyl mercury	22967-92-6	8.0E+00	n	—	—	—	—	—	—	—	—	—	—	8.0E+00	n	—	—	—	—	—	—	—	—	—	—	—		
Methyl methacrylate	80-62-6	9.8E+03	n	9.8E+01	n	9.8E+03	n	1.1E+04	n	2.3E+05	n >S	—	—	5.3E+03	n	4.9E+01	n	4.9E+03	n	5.5E+03	n	1.5E+04	n	n	—	—	—	
Methyl methanesulfonate	66-27-3	3.3E+01	c	1.8E-02	c	1.8E+00	c	1.1E+02	c	3.2E+04	c	—	—	2.6E+01	c	8.9E-03	c	8.9E-01	c	5.7E+01	c	2.1E+03	c	n	—	—	—	
Methyl parathion	298-00-0	1.7E+01	n	1.7E-01	n	1.7E+01	n	—	—	—	—	—	—	1.7E+01	n	8.5E-02	n	8.5E+00	n	—	—	—	—	—	—	—		
Methyl-1-butene, 2-	563-46-2	4.8E+03	n	6.5E+01	n	6.5E+03	n >S	2.8E+05	n	3.4E+05	n >S	—	—	4.7E+03	n	3.2E+01	n	3.2E+03	n >S	1.4E+05	n	2.2E+04	n >S	n	—	—	—	
Methyl-1-propanal, 2- (isobutyraldehyde)	78-84-2	3.3E+03	n	2.1E+00	n	2.1E+02	n	—	—	—	—	—	—	3.3E+03	n	1.0E+00	n	1.0E+02	n	—	—	—	—	—	—	—		
Methyl-2-butene, 2-	513-35-9	4.8E+03	n	3.9E+01	n	3.9E+03	n	2.8E+05	n	4.0E+05	n >S	—	—	4.7E+03	n	1.9E+01	n	1.9E+03	n	1.4E+05	n	2.6E+04	n >S	n	—	—	—	
Methyl-2-pentenal, 2-	623-36-9	3.2E+00	c	1.5E-03	c	1.5E-01	c	—	—	—	—	—	—	3.2E+00	c	7.3E-04	c	7.3E-02	c	—	—	—	—	—	—	—		
Methyl-5-nitroaniline, 2- (5-nitro-o-toluidine)	99-55-8	2.3E+03	c	—	—	—	—	—	—	—	—	—	—	2.3E+03	c	—	—	—	—	—	—	—	—	—	—	—		
Methylcholanthrene, 3-	56-49-5	1.9E-01	c	1.5E+01	c	1.5E+03	c >S	1.8E+03	c	1.0E+06	c >S	—	—	1.9E-01	c	7.6E+00	c	7.6E+02	c >S	9.0E+02	c	1.0E+06	c >S	c	—	—	—	
Methylene bromide (dibromomethane)	74-95-3	8.1E+01	n	1.1E+00	c	1.1E+02	c	8.2E+01	n	2.2E+03	n	—	—	4.2E+01	n	5.6E-01	c	5.6E+01	c	4.2E+01	n	1.4E+02	n	n	—	—	—	
Methylene chloride (dichloromethane)	75-09-2	1.6E+03	n	1.3E-02	m	1.3E+00	m	1.3E+04	c	5.6E+04	c >S	—	—	1.5E+03	n	6.5E-03	m	6.5E-01	m	6.6E+03	c	3.6E+03	c	c	—	—	—	
Methylene-bis (2-chloroaniline) 4,4'-	101-14-4	4.6E+01	c	2.9E+00	c	2.9E+02	c	2.7E+03	c	1.0E+06	c >S	—	—	4.5E+01	c	1.4E+00	c	1.4E+02	c	1.4E+03	c	4.1E+05	c >S	n	—	—	—	
Methylmercury hydroxide	1184-57-2	6.7E+00	n	4.8E-03	n	4.8E-01	n	—	—	—	—	—	—	6.7E+00	n	2.4E-03	n	2.4E-01	n	—	—	—	—	—	—	—		
Methylnaphthalene, 1-	90-12-0	1.5E+02	c	2.9E+00	c	2.9E+02	c	—	—	—	—	—	—	1.5E+02	c	1.5E+00	c	1.5E+02	c	—	—	—	—	—	—	—		
Methylnaphthalene, 2-	91-57-6	2.5E+02	n	1.7E+01	n	1.7E+03	n	—	—	—	—	—	—	2.5E+02	n	8.5E+00	n	8.5E+02	n	—	—	—	—	—	—	—		
Methylpyrrolidone, N-	872-50-4	1.3E+03	n	9.6E-01	n	9.6E+01	n	—	—	—	—	—	—	1.3E+03	n	4.8E-01	n	4.8E+01	n	—	—	—	—	—	—	—		
Methylstyrene, alpha-	98-83-9	2.8E+02	n	6.5E+00	n	6.5E+02	n	4.8E+02	n	2.1E+04	n >S	—	—	1.8E+02	n	3.3E+00	n	3.3E+02	n	2.5E+02	n	1.4E+03	n >S	n	—	—	—	
Methyltetrahydrofuran, 2-	96-47-9	1.5E+02	c	2.7E-01	c	2.7E+01	c	1.9E+02	c	4.2E+03	c	—	—	8.6E+01	c	1.4E-01	c	1.4E+01	c	9.7E+01	c	2.7E+02	c	c	—	—	—	
Methyltetrahydropyran, 2-	10141-72-7	1.7E+02	c	3.3E-01	c	3.3E+01	c	2.2E+02	c	5.7E+03	c	—	—	9.8E+01	c	1.6E-01	c	1.6E+01	c	1.1E+02	c	3.7E+02	c	n	—	—	—	
Metolachlor	51218-45-2	1.0E+04	n	1.1E+02	n	1.1E+04	n	—	—	—	—	—	—	1.0E+04	n	5.5E+01	n	5.5E+03	n	—	—	—	—	—	—	—		
Metribuzin	21087-64-9	1.7E+03	n	1.2E+00	n	1.2E+02	n	—	—	—	—	—	—	1.7E+03	n	6.1E-01	n	6.1E+01	n	—	—	—	—	—	—	—		
Mirex	2385-85-5	1.3E+01	n	4.5E+03	n >S	4.5E+05	n >S	—	—	—	—	—	—	1.3E+01	n	2.2E+03	n >S	2.2E+05	n >S	—	—	—	—	—	—	—		
Molinate	2212-67-1	1.3E+02	n	1.9E-01	n	1.9E+01	n	—	—	—	—	—	—	1.3E+02	n	9.6E-02	n	9.6E+00	n	—	—	—	—	—	—	—		
Molybdenum	7439-98-7	1.6E+02	n	4.9E+01	n >S	4.9E+03	n >S	—	—	—	—	—	—	1.6E+02	n	2.5E+01	n >S	2.5E+03	n >S	—	—	—	—	—	—	—		
Monocrotophos	2157-98-4	4.0E+01	n	2.9E-02	n	2.9E+00	n	—	—	—	—	—	—	4.0E+01	n	1.5E-02	n	1.5E+00	n	—	—	—	—	—	—	—		
Morpholine	110-91-8	1.0E+06	n	2.4E+04	n	1.0E+06	n	—	—	—	—	—	—	1.0E+06	n	1.2E+04	n	9.8E+05	n	—	—	—	—	—	—	—		
Morpholine, N-butyl-	1005-67-0	1.5E+02	n	2.3E-01	n	2.3E+01	n	—	—	—	—	—	—	1.5E+02	n	1.2E-01	n	1.2E+01	n	—	—	—	—	—	—	—		
MTBE (methyl tert-butyl ether) <sup>8</sup>	1634-04-4	8.0E+02	n	6.2E-01	n																							

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area										30 acre source area													
Chemical of Concern		CAS	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	
Naphthylamine, 2-	91-59-8	2.6E+00	c	1.3E-02	c	1.3E+00	c	—	—	—	—	—	2.6E+00	c	6.4E-03	c	6.4E-01	c	—	—	—	—	—	—	—
Napropamide	15299-99-7	6.7E+03	n	5.5E+02	n	5.5E+04	n >S	—	—	—	—	—	6.7E+03	n	2.7E+02	n	2.7E+04	n >S	—	—	—	—	—	—	—
Neopentyl glycol	126-30-7	2.0E+04	n	1.5E+01	n	1.5E+03	n	—	—	—	—	—	2.0E+04	n	7.3E+00	n	7.3E+02	n	—	—	—	—	—	—	—
Nickel and compounds	7440-02-0	8.4E+02	n	1.6E+02	n >S	1.6E+04	n >S	—	—	—	—	—	8.4E+02	n	7.9E+01	n >S	7.9E+03	n >S	—	—	—	—	—	—	—
Nitrate	14797-55-8	1.3E+05	n	1.9E+01	m	1.9E+03	m	—	—	—	—	—	1.3E+05	n	9.6E+00	m	9.6E+02	m	—	—	—	—	—	—	—
Nitrite	14797-65-0	8.0E+03	n	—	—	—	—	—	—	—	—	—	8.0E+03	n	—	—	—	—	—	—	—	—	—	—	—
Nitroaniline, 2-	88-74-4	1.4E+01	n	2.2E-02	n	2.2E+00	n	4.8E+01	n	1.2E+04	n >S	—	1.1E+01	n	1.1E-02	n	1.1E+00	n	2.4E+01	n	7.7E+02	n	—	—	—
Nitroaniline, 3-	99-09-2	1.5E+01	n	2.6E-02	n	2.6E+00	n	6.0E+01	n	1.7E+04	n >S	—	1.2E+01	n	1.3E-02	n	1.3E+00	n	3.1E+01	n	1.1E+03	n >S	—	—	—
Nitroaniline, 4-	100-01-6	2.2E+02	n	1.1E-01	c	1.1E+01	c	1.2E+03	n	3.4E+05	n >S	—	1.9E+02	n	5.4E-02	c	5.4E+00	c	6.2E+02	n	2.2E+04	n >S	—	—	—
Nitrobenzene	98-95-3	6.6E+01	c	3.5E-01	n	3.5E+01	n	6.6E+01	c	5.2E+03	c	—	3.4E+01	c	1.8E-01	n	1.8E+01	n	3.4E+01	c	3.4E+02	c	—	—	—
Nitroglycerin	55-63-0	6.7E+00	n	1.4E-02	n	1.4E+00	n	—	—	—	—	—	6.7E+00	n	6.9E-03	n	6.9E-01	n	—	—	—	—	—	—	—
Nitrophenol, 2-	88-75-5	1.3E+02	n	1.3E-01	n	1.3E+01	n	—	—	—	—	—	1.3E+02	n	6.7E-02	n	6.7E+00	n	—	—	—	—	—	—	—
Nitrophenol, 3-	554-84-7	1.3E+02	n	2.3E-01	n	2.3E+01	n	—	—	—	—	—	1.3E+02	n	1.1E-01	n	1.1E+01	n	—	—	—	—	—	—	—
Nitrophenol, 4-	100-02-7	1.3E+02	n	1.0E-01	n	1.0E+01	n	—	—	—	—	—	1.3E+02	n	5.0E-02	n	5.0E+00	n	—	—	—	—	—	—	—
Nitropropane, 2-	79-46-9	1.3E-01	c	7.1E-03	n	7.1E-01	n	1.3E-01	c	3.6E+00	c	—	6.8E-02	c	3.5E-03	n	3.5E-01	n	6.8E-02	c	2.3E-01	c	—	—	—
Nitroquinoline-N-oxide, 4-	56-57-5	4.0E-01	c	2.3E-04	c	2.3E-02	c	1.9E+00	c	2.7E+04	c	—	3.3E-01	c	1.2E-04	c	1.2E-02	c	9.7E-01	c	1.3E+04	c	—	—	—
Nitrosodiethanolamine	1116-54-7	1.7E+00	c	6.6E-04	c	6.6E-02	c	—	—	—	—	—	1.7E+00	c	3.3E-04	c	3.3E-02	c	—	—	—	—	—	—	—
Nitrosodiethylamine, n-	55-18-5	2.5E-02	c	1.2E-05	c	1.2E-03	c	6.6E-02	c	1.5E+01	c	—	1.8E-02	c	6.2E-06	c	6.2E-04	c	3.4E-02	c	9.7E-01	c	—	—	—
Nitrosodimethylamine, n-	62-75-9	7.4E-02	c	3.7E-05	c	3.7E-03	c	2.0E-01	c	4.2E+01	c	—	5.5E-02	c	1.8E-05	c	1.8E-03	c	1.0E-01	c	2.7E+00	c	—	—	—
Nitrosodi-n-butylamine, n-	924-16-3	4.7E-01	c	1.9E-03	c	1.9E-01	c	1.0E+00	c	5.2E+01	c	—	3.3E-01	c	9.4E-04	c	9.4E-02	c	5.3E-01	c	3.4E+00	c	—	—	—
Nitrosodi-n-propylamine, n-	621-64-7	4.0E-01	c	3.5E-04	c	3.5E-02	c	—	—	—	—	—	4.0E-01	c	1.8E-04	c	1.8E-02	c	—	—	—	—	—	—	—
Nitrosodiphenylamine	86-30-6	5.7E+02	c	2.8E+00	c	2.8E+02	c	—	—	—	—	—	5.7E+02	c	1.4E+00	c	1.4E+02	c	—	—	—	—	—	—	—
Nitroso-methyl-ethyl-amine, n-	10595-95-6	2.8E-01	c	1.1E-04	c	1.1E-02	c	—	—	—	—	—	2.8E-01	c	5.7E-05	c	5.7E-03	c	—	—	—	—	—	—	—
Nitrosomorpholine, N-	59-89-2	5.0E-01	c	2.6E-04	c	2.6E-02	c	1.7E+00	c	5.2E+02	c	—	3.9E-01	c	1.3E-04	c	1.3E-02	c	8.8E-01	c	3.4E+01	c	—	—	—
Nitroso-n-ethylurea, n-	759-73-9	3.4E-02	c	2.1E-05	c	2.1E-03	c	—	—	—	—	—	3.4E-02	c	1.0E-05	c	1.0E-03	c	—	—	—	—	—	—	—
Nitrosopiperidine, N-	100-75-4	3.6E-01	c	2.1E-04	c	2.1E-02	c	1.3E+00	c	3.5E+02	c	—	2.9E-01	c	1.0E-04	c	1.0E-02	c	6.9E-01	c	2.3E+01	c	—	—	—
Nitrosopyrrolidine, n-	930-55-2	1.6E+00	c	8.4E-04	c	8.4E-02	c	5.8E+00	c	1.9E+03	c	—	1.3E+00	c	4.2E-04	c	4.2E-02	c	3.0E+00	c	1.2E+02	c	—	—	—
Nitrotoluene, m-	99-08-1	6.7E+02	n	1.8E+00	n	1.8E+02	n	—	—	—	—	—	6.7E+02	n	9.2E-01	n	9.2E+01	n	—	—	—	—	—	—	—
Nitrotoluene, o-	88-72-2	2.1E+01	c	3.1E-02	c	3.1E+00	c	—	—	—	—	—	2.1E+01	c	1.6E-02	c	1.6E+00	c	—	—	—	—	—	—	—
Nitrotoluene, p-	99-99-0	2.7E+02	n	4.3E-01	c	4.3E+01	c	—	—	—	—	—	2.7E+02	n	2.2E-01	c	2.2E+01	c	—	—	—	—	—	—	—
Nonachlor, cis-	5103-73-1	5.6E+00	c	1.3E+01	c	1.3E+03	c >S	1.2E+03	c	1.0E+06	c >S	—	5.6E+00	c	6.3E+00	c	6.3E+02	c >S	6.4E+02	c	2.4E+05	c >S	—	—	—
Nonachlor, trans-	39765-80-5	5.6E+00	c	1.3E+01	c	1.3E+03	c >S	1.2E+03	c	1.0E+06	c >S	—	5.6E+00	c	6.3E+00	c	6.3E+02	c >S	6.4E+02	c	2.4E+05	c >S	—	—	—
Nonanal	124-19-6	1.3E+04	n	1.5E+02	n	1.5E+04	n >S	—	—	—	—	—	1.3E+04	n	7.4E+01	n	7.4E+03	n >S	—	—	—	—	—	—	—
Nonene, 1-n	124-11-8	8.2E+03	n	3.3E+03	n >S	3.3E+05	n >S	—	—	—	—	—	8.2E+03	n	1.6E+03	n >S	1.6E+05	n >S	—	—	—	—	—	—	—
Nonylphenol, 4-n-	104-40-5	6.5E+03	n	3.0E+05	n >S	1.0E+06	n >S	—	—	—	—	—	6.5E+03	n	1.5E+05	n >S	1.0E+06	n >S	—	—	—	—	—	—	—
Nonylphenol ethoxylate	9016-45-9	6.5E+03	n	7.5E+05	n >S	1.0E+06	n >S	—	—	—	—	—	6.5E+03	n	3.7E+05	n >S	1.0E+06	n >S	—	—	—	—	—	—	—
Octamethylpyrophosphoramide	152-16-9	1.3E+02	n	9.4E-02	n	9.4E+00	n	—	—	—	—	—	1.3E+02	n	4.7E-02	n	4.7E+00	n	—	—	—	—	—	—	—
Octanone	106-68-3	4.9E+03	n	1.1E+01	n	1.1E+03	n	9.0E+05	n	1.0E+06	n >S	—	4.9E+03	n	5.5E+00	n	5.5E+02	n	4.6E+05	n	1.0E+06	n >S	—	—	—
Oxamyl	23135-22-0	1.7E+03	n	4.2E-01	m	4.2E+01	m	—	—	—	—	—	1.7E+03	n	2.1E-01	m	2.1E+01	m	—	—	—	—	—	—	—
Oxychlordan	27304-13-8	5.6E+00	c	1.3E+01	c	1.3E+03	c >S	1.2E+03	c	1.0E+06	c >S	—	5.6E+00	c	6.3E+00	c	6.3E+02	c >S	6.4E+02	c	2.4E+05	c >S	—	—	—
Paraquat	1910-42-5	3.0E+02	n	2.1E-01	n	2.1E+01	n	—	—	—	—	—	3.0E+02	n	1.1E-01	n	1.1E+01	n	—	—	—	—	—	—	—
Parathion (ethyl parathion)	56-38-2	4.0E+02	n	3.3E+01	n	3.3E+03	n >S	—	—	—	—	—	4.0E+02	n	1.7E+01	n	1.7E+03	n >S	—	—	—	—	—	—	—
Pebulate	1114-71-2	3.3E+03	n	2.3E+01	n	2.3E+03	n >S	—	—	—	—	—	3.3E+03	n	1.2E+01	n	1.2E+03	n >S	—	—	—	—	—	—	—
Pendimethalin	40487-42-1	2.5E+03	n	7.5E+03	n >S	7.5E+05	n >S	—	—	—	—	—	2.5E+03	n	3.7E+03	n >S	3.7E+05	n >S	—	—	—	—	—	—	—
Pentachlorobenzene	608-93-5	5.3E+01	n	2.5E+01	n	2.5E+03	n >S	—	—	—	—	—	5.3E+01	n	1.2E+01	n	1.2E+03	n >S	—	—	—	—	—	—	—
Pentachloroethane	76-01-7	3.9E+01	c	9.7E-02	c	9.7E+00	c	9.4E+01	c	2.8E+03	c	—	2.8E+01	c	4.8E-02	c	4.8E+00	c	4.8E+01	c	1.8E+02	c	—	—	—
Pentachloronitrobenzene	82-68-8	1.0E+01	c	1.8E+00	c	1.8E+02	c >S	—	—	—	—	—	1.0E+01	c	9.2E-01	c	9.2E+01	c >S	—	—	—	—	—	—	—
Pentachlorophenol	87-86-5	7.3E-01	c	1.8E-02	m	1.8E+00	m	—	—	—	—	—	7.3E-01	c	9.2E-03	m	9.2E-01	m	—	—	—	—	—	—	—
Pentadiene, 1,3-cis-	1574-41-0	4.8E+03	n	1.9E+01	n	1.9E+03	n	2.8E+05	n	5.5E+05	n >S	—	4.7E+03	n	9.4E+00	n	9.4E+02	n	1.4E+05	n	3.6				

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

Last Revised: November 12, 2014

		0.5 acre source area										30 acre source area																						
Chemical of Concern		CAS	<sup>1</sup> Soil <sub>Comb</sub> <sup>2</sup> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		note <sup>3</sup>	<sup>1</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		note <sup>3</sup>	<sup>1</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		note <sup>3</sup>					
Pentane	109-66-0		5.0E+04	n		4.0E+03	n		4.0E+05	n	>S	3.7E+05	n		8.1E+04	n	>S	—	4.4E+04	n		2.0E+03	n		2.0E+05	n	>S	1.9E+05	n		5.2E+03	n	>S	—
Pentane, 2-methyl-	107-83-5		4.8E+03	n		3.8E+02	n		3.8E+04	n	>S	2.8E+05	n		4.5E+05	n	>S	—	4.7E+03	n		1.9E+02	n		1.9E+04	n	>S	1.4E+05	n		2.9E+04	n	>S	—
Pentane, 3-methyl-	96-14-0		4.8E+03	n		3.1E+02	n		3.1E+04	n	>S	2.8E+05	n		4.7E+05	n	>S	—	4.7E+03	n		1.6E+02	n		1.6E+04	n	>S	1.4E+05	n		3.1E+04	n	>S	—
Pentandiol, 1,5-	111-29-5		3.0E+05	n		2.4E+02	n		2.4E+04	n		1.0E+06	n		1.0E+06	n	>S	—	2.7E+05	n		1.2E+02	n		1.2E+04	n		1.0E+06	n		9.9E+05	n	>S	—
Pentanol, 1-	71-41-0		2.7E+03	n		2.3E+00	n		2.3E+02	n		—	—	n		—	—	—	2.7E+03	n		1.1E+00	n		1.1E+02	n		—	—	n		—	—	—
Pentanol, 4-methyl-2-	108-11-2		2.1E+03	n		1.8E+00	n		1.8E+02	n		—	—	n		—	—	—	2.1E+03	n		8.8E-01	n		8.8E+01	n		—	—	n		—	—	—
Pentanone, 2-	107-87-9		3.3E+03	n		2.2E+00	n		2.2E+02	n		—	—	n		—	—	—	3.3E+03	n		1.1E+00	n		1.1E+02	n		—	—	n		—	—	—
Pentene, 2-	109-68-2		4.8E+03	n		4.7E+01	n		4.7E+03	n		2.8E+05	n		4.5E+05	n	>S	—	4.7E+03	n		2.3E+01	n		2.3E+03	n		1.4E+05	n		2.9E+04	n	>S	—
Pentyne, 1-	627-19-0		4.8E+03	n		1.3E+01	n		1.3E+03	n		2.8E+05	n		6.2E+05	n	>S	—	4.7E+03	n		6.3E+00	n		6.3E+02	n		1.4E+05	n		4.0E+04	n	>S	—
Perchlorate	14797-73-0		5.1E+01	n		1.4E-01	n		1.4E+01	n		—	—	n		—	—	—	5.1E+01	n		7.0E-02	n		7.0E+00	n		—	—	n		—	—	—
Perfluorooctanoic sulfonic acid (1-Octanesulfonic acid, heptafluoro-1-)	1763-23-1		5.3E-01	n		1.7E-02	n		1.7E+00	n		5.2E+01	n		5.5E+04	n	>S	—	5.2E-01	n		8.7E-03	n		8.7E-01	n		2.7E+01	n		3.6E+03	n		—
Perfluoroundecanoic acid (Undecanoic acid, uncosafluoro-)	2058-94-8		2.7E-01	n		6.1E-03	n		6.1E-01	n		—	—	n		—	—	—	2.7E-01	n		3.1E-03	n		3.1E-01	n		—	—	n		—	—	—
Perfluoropentanoic acid (Pentanoic acid, nonafluoro-)	2706-90-3		1.5E+00	n		1.9E-03	n		1.9E-01	n		—	—	n		—	—	—	1.5E+00	n		9.7E-04	n		9.7E-02	n		—	—	n		—	—	—
Perfluorohexanoic acid (Hexanoic acid, undecafluoro-)	307-24-4		1.5E+00	n		2.9E-03	n		2.9E-01	n		—	—	n		—	—	—	1.5E+00	n		1.5E-03	n		1.5E-01	n		—	—	n		—	—	—
Perfluorododecanoic acid (Dodecanoic acid, tricosfluoro-)	307-55-1		2.6E-01	n		1.1E-02	n		1.1E+00	n		2.3E+01	n		2.1E+04	n	>S	—	2.6E-01	n		5.6E-03	n		5.6E-01	n		1.2E+01	n		1.4E+03	n	>S	—
Perfluorooctanoic acid (Octanoic acid, pentadecafluoro-)	335-67-1		2.4E-01	n		9.9E-04	n		9.9E-02	n		2.4E+00	n		8.9E+02	n		—	2.2E-01	n		4.9E-04	n		4.9E-02	n		1.2E+00	n		5.8E+01	n		—
Perfluorodecanoic acid (Decanoic acid, nonadecafluoro-)	335-76-2		3.3E-01	n		7.5E-03	n		7.5E-01	n		2.8E+01	n		2.5E+04	n	>S	—	3.3E-01	n		3.7E-03	n		3.7E-01	n		1.4E+01	n		1.6E+03	n	>S	—
Perfluorodecane sulfonic acid (1-Decanesulfonic acid, heneicosfluoro-)	335-77-3		2.7E-01	n		1.3E-02	n		1.3E+00	n		—	—	n		—	—	—	2.7E-01	n		6.7E-03	n		6.7E-01	n		—	—	n		—	—	—
Perfluorohexane sulfonic acid (1-Hexanesulfonic acid, tridecafluoro-)	355-46-4		1.5E+00	n		1.2E-02	n		1.2E+00	n		7.1E+01	n		3.9E+04	n	>S	—	1.5E+00	n		6.2E-03	n		6.2E-01	n		3.6E+01	n		3.9E+03	n	>S	—
Perfluorobutyric acid (Butanoic acid, heptafluoro-)	375-22-4		5.8E+01	n		6.5E-02	n		6.5E+00	n		6.6E+02	n		7.9E+05	n		—	5.4E+01	n		3.2E-02	n		3.2E+00	n		3.4E+02	n		3.3E+05	n		—
Perfluorobutane sulfonic acid (1-Butanesulfonic acid, nonafluoro-)	375-73-5		2.6E+01	n		3.2E-02	n		3.2E+00	n		3.5E+02	n		5.1E+05	n	>S	—	2.4E+01	n		1.6E-02	n		1.6E+00	n		1.8E+02	n		2.2E+05	n	>S	—
Perfluoroheptanoic acid (Heptanoic acid, tridecafluoro-)	375-85-9		5.3E-01	n		1.6E-03	n		1.6E-01	n		—	—	n		—	—	—	5.3E-01	n		7.9E-04	n		7.9E-02	n		—	—	n		—	—	—
Perfluorononanoic acid (Nonanoic acid, heptadecafluoro-)	375-95-1		2.6E-01	n		1.0E-03	n		1.0E-01	n		1.7E+01	n		6.8E+03	n	>S	—	2.6E-01	n		5.1E-04	n		5.1E-02	n		8.9E+00	n		4.4E+02	n	>S	—
Perfluorotetradecanoic acid (Tetradecanoic acid, heptacosfluoro-)	376-06-7		1.7E-01	n		3.8E-02	n		3.8E+00	n	>S	—	—	n		—	—	—	1.7E-01	n		1.9E-02	n		1.9E+00	n	>S	—	—	n		—	—	—
Perfluorotridecanoic acid (Tridecanoic acid, pentacosfluoro-)	72629-94-8		2.0E-01	n		2.0E-02	n		2.0E+00	n	>S	—	—	n		—	—	—	2.0E-01	n		1.0E-02	n		1.0E+00	n	>S	—	—	n		—	—	—
Perfluorooctane sulfonamide (1-Octanesulfonamide, heptafluoro-1-)	754-91-6		5.0E-02	n		3.1E-01	n		3.1E+01	n		6.1E-02	n		1.6E-01	n		—	2.8E-02	n		1.5E-01	n		1.5E+01	n		3.2E-02	n		1.0E-02	n		—
Perylene	198-55-0		1.3E+03	n		7.6E+04	n	>S	1.0E+06	n	>S	—	—	n		—	—	—	1.3E+03	n		3.8E+04	n	>S	1.0E+06	n	>S	—	—	n		—	—	—
Phenacetin	62-44-2		1.8E+03	c		1.2E+00	c		1.2E+02	c		1.1E+04	c		1.0E+06	c	>S	—	1.5E+03	c		6.2E-01	c		6.2E+01	c		5.6E+03	c		2.3E+05	c	>S	—
Phenanthrene	85-01-8		1.7E+03	n		4.2E+02	n		4.2E+04	n	>S	—	—	n		—	—	—	1.7E+03	n		2.1E+02	n		2.1E+04	n	>S	—	—	n		—	—	—
Phenanthridine	229-87-8		2.0E+02	n		5.3E+00	n		5.3E+02	n		—	—	n		—	—	—	2.0E+02	n		2.6E+00	n		2.6E+02	n		—	—	n		—	—	—
Phenol	108-95-2		2.0E+04	n		1.9E+01	n		1.9E+03	n		—	—	n		—	—	—	2.0E+04	n		9.6E+00	n		9.6E+02	n		—	—	n		—	—	—
Phenol, 4-tert-butyl-	98-54-4		3.3E+02	n		4.5E+00	n		4.5E+02	n		—	—	n		—	—	—	3.3E+02	n		2.3E+00	n		2.3E+02	n		—	—	n		—	—	—
Phenothiazine	92-84-2		6.3E+01	n		8.0E+00	n	>S	8.0E+02	n	>S	—	—	n		—	—	—	6.3E+01	n		4.0E+00	n	>S	4.0E+02	n	>S	—	—	n		—	—	—
Phenyl mercuric acetate	62-38-4		5.3E+00	n		1.6E-02	n		1.6E+00	n		—	—	n		—	—	—	5.3E+00	n		8.1E-03	n		8.1E-01	n		—	—	n		—	—	—
Phenylene diamine, m-	108-45-2		4.0E+02	n		2.9E-01	n		2.9E+01	n		—	—	n		—	—	—	4.0E+02	n		1.4E-01	n		1.4E+01	n		—	—	n		—	—	—
Phenylene diamine, p-	106-50-3		1.3E+04	n		9.1E+00	n		9.1E+02	n		—	—	n		—	—	—	1.3E+04	n		4.6E+00	n		4.6E+02	n		—	—	n		—	—	—
Phorate	298-02-2		1.3E+01	n		1.1E+00	n		1.1E+02	n		—	—	n		—	—	—	1.3E+01	n		5.4E-01	n		5.4E+01	n		—	—	n		—	—	—
Phosalone	2310-17-0		1.3E+02	n		2.3E+00	n		2.3E+02	n		—	—	n		—	—	—	1.3E+02	n		1.2E+00	n		1.2E+02	n		—	—	n		—	—	—
Phosdrin (mevinphos)	7786-34-7		1.7E+00	n		1.2E-03	n		1.2E-01	n		—	—	n		—	—	—	1.7E+00	n		5.9E-04	n		5.9E-02	n		—	—	n		—	—	—
Phosmet	732-11-6		1.3E+03	n		4.1E+00	n		4.1E+02	n		—	—	n		—	—	—	1.3E+03	n		2.0E+00	n		2.0E+02	n		—	—	n		—	—	—
Phosphine	7803-51-2		3.8E+00	n		—	—		—	—		4.6E+00	n		—	—	—	—	2.1E+00	n		—	—		—	—	2.4E+00	n		—	—	—	—	—
Phosphorotriethic acid, S,S,S-tributyl ester	78-48-8		5.2E+01	c		4.3E+02	c	>S	4.3E+04	c	>S	—	—	n		—	—	—	5.2E+01	c		2.2E+02	c	>S	2.2E+04	c	>S	—	—	n		—	—	—
Phosphorus, total*	7723-14-0		—	—		—	—		—	—		—	—	n		—	—	—	—	—		—	—		—	—	n		—	—	—	—</		

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area												30 acre source area											
Chemical of Concern		CAS	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg)		GWSoil <sub>Ing</sub> (mg/kg)		GWSoil <sub>Class 3</sub> (mg/kg)		Al <sup>3</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		Al <sup>3</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		GWSoil for Secondary MCL (mg/kg)	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg)		GWSoil <sub>Ing</sub> (mg/kg)		GWSoil <sub>Class 3</sub> (mg/kg)		Al <sup>3</sup> Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg)		Al <sup>3</sup> GW- Soil <sub>Inh-V</sub> (mg/kg)		GWSoil for Secondary MCL (mg/kg)	
			note <sup>3</sup>		note <sup>3</sup>			note <sup>3</sup>			note <sup>3</sup>				note <sup>3</sup>		note <sup>3</sup>		note <sup>3</sup>		note <sup>3</sup>		note <sup>3</sup>		
Potassium*	7440--09-27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Primene	68955-53-3	3.6E+02	n	5.4E+01	n	5.4E+03	n	—	—	—	—	—	—	—	3.6E+02	n	2.7E+01	n	2.7E+03	n	—	—	—	—	
Prometon (pramitol)	1610-18-0	1.0E+03	n	9.6E+00	n	9.6E+02	n	—	—	—	—	—	—	—	1.0E+03	n	4.8E+00	n	4.8E+02	n	—	—	—	—	
Prometryn	7287-19-6	2.7E+03	n	9.8E+01	n	9.8E+03	n >S	—	—	—	—	—	—	—	2.7E+03	n	4.9E+01	n	4.9E+03	n >S	—	—	—	—	
Pronamide	23950-58-5	5.0E+03	n	1.8E+01	n	1.8E+03	n >S	—	—	—	—	—	—	—	5.0E+03	n	9.1E+00	n	9.1E+02	n >S	—	—	—	—	
Propanal (propionaldehyde)	123-38-6	1.0E+02	n	3.9E-01	n	3.9E+01	n	1.2E+02	n	3.3E+03	n	—	—	—	5.8E+01	n	2.0E-01	n	2.0E+01	n	6.3E+01	n	2.1E+02	n	
Propane, 1-bromo-	106-94-5	2.9E+03	n	3.4E+00	n	3.4E+02	n	—	—	—	—	—	—	—	2.9E+03	n	1.7E+00	n	1.7E+02	n	—	—	—	—	
Propanil	709-98-8	3.3E+02	n	4.7E+00	n	4.7E+02	n	—	—	—	—	—	—	—	3.3E+02	n	2.3E+00	n	2.3E+02	n	—	—	—	—	
Propanoic acid (propionic acid)	79-09-4	4.1E+04	n	2.3E+01	n	2.3E+03	n	—	—	—	—	—	—	—	4.1E+04	n	1.2E+01	n	1.2E+03	n	—	—	—	—	
Propanol, 1-	71-23-8	1.6E+04	n	1.0E+01	n	1.0E+03	n	—	—	—	—	—	—	—	1.6E+04	n	5.0E+00	n	5.0E+02	n	—	—	—	—	
Propargite	2312-35-8	1.3E+03	n	1.1E+02	n	1.1E+04	n >S	—	—	—	—	—	—	—	1.3E+03	n	5.5E+01	n	5.5E+03	n >S	—	—	—	—	
Propargyl alcohol	107-19-7	1.6E+02	n	1.0E-01	n	1.0E+01	n	—	—	—	—	—	—	—	1.6E+02	n	5.2E-02	n	5.2E+00	n	—	—	—	—	
Propazine	139-40-2	1.1E+02	c	9.5E-01	c	9.5E+01	c	—	—	—	—	—	—	—	1.1E+02	c	4.7E-01	c	4.7E+01	c	—	—	—	—	
Propham	122-42-9	1.3E+03	n	1.9E+00	n	1.9E+02	n	—	—	—	—	—	—	—	1.3E+03	n	9.7E-01	n	9.7E+01	n	—	—	—	—	
Propionitrile (propane nitrile)	107-12-0	3.3E+01	n	1.9E-02	n	1.9E+00	n	—	—	—	—	—	—	—	3.3E+01	n	9.7E-03	n	9.7E-01	n	—	—	—	—	
Propyl acetate, n-	109-60-4	7.4E+03	n	5.3E+00	n	5.3E+02	n	—	—	—	—	—	—	—	7.4E+03	n	2.7E+00	n	2.7E+02	n	—	—	—	—	
Propylbenzene, n-	103-65-1	2.2E+03	n	4.5E+01	n	4.5E+03	n >S	6.3E+03	n	2.8E+05	n >S	—	—	—	1.6E+03	n	2.2E+01	n	2.2E+03	n >S	3.3E+03	n	1.8E+04	n >S	
Propylene glycol	57-55-6	3.7E+02	n	9.4E+02	n	9.4E+04	n	3.7E+02	n	9.6E+04	n	—	—	—	1.9E+02	n	4.7E+02	n	4.7E+04	n	1.9E+02	n	6.2E+03	n	
Propylene glycol monomethyl ether	107-98-2	4.6E+04	n	3.3E+01	n	3.3E+03	n	2.3E+05	n	1.0E+06	n >S	—	—	—	3.9E+04	n	1.7E+01	n	1.7E+03	n	1.2E+05	n	9.7E+05	n >S	
Propylene oxide	75-56-9	2.0E+01	c	7.5E-03	c	7.5E-01	c	9.7E+01	c	3.1E+03	c	—	—	—	1.7E+01	c	3.8E-03	c	3.8E-01	c	5.0E+01	c	2.0E+02	c	
Propylene tetramer	6842-15-5	4.6E+03	n	2.5E+04	n >S	1.0E+06	n >S	1.5E+04	n	4.6E+05	n >S	—	—	—	3.6E+03	n	1.3E+04	n >S	1.0E+06	n >S	7.9E+03	n	2.9E+04	n >S	
Prothiofos (Tokuthion)	34643-46-4	6.6E+00	n	2.4E+03	n	2.4E+05	n >S	—	—	—	—	—	—	—	6.6E+00	n	1.2E+03	n	1.2E+05	n >S	—	—	—	—	
Pyrene	129-00-0	1.7E+03	n	1.1E+03	n >S	1.1E+05	n >S	—	—	—	—	—	—	—	1.7E+03	n	5.6E+02	n >S	5.6E+04	n >S	—	—	—	—	
Pyridine	110-86-1	8.2E+01	n	6.9E-02	n	6.9E+00	n	—	—	—	—	—	—	—	8.2E+01	n	3.5E-02	n	3.5E+00	n	—	—	—	—	
Quinoline	91-22-5	1.6E+00	c	7.5E-03	c	7.5E-01	c	—	—	—	—	—	—	—	1.6E+00	c	3.8E-03	c	3.8E-01	c	—	—	—	—	
Ronnel	299-84-3	2.3E+03	n	4.2E+02	n	4.2E+04	n >S	—	—	—	—	—	—	—	2.3E+03	n	2.1E+02	n	2.1E+04	n >S	—	—	—	—	
Safrole	94-59-7	1.6E+01	c	1.6E-01	c	1.6E+01	c	6.7E+01	c	7.5E+03	c >S	—	—	—	1.3E+01	c	8.2E-02	c	8.2E+00	c	3.4E+01	c	4.8E+02	c	
Selenium	7782-49-2	3.1E+02	n	2.3E+00	m >S	2.3E+02	m >S	—	—	—	—	—	—	—	3.1E+02	n	1.1E+00	m >S	1.1E+02	m >S	—	—	—	—	
Selenourea	630-10-4	4.1E+02	n	—	—	—	—	—	—	—	—	—	—	—	4.1E+02	n	—	—	—	—	—	—	—	—	
Silver	7440-22-4	9.7E+01	n	4.8E-01	n >S	4.8E+01	n >S	—	—	—	—	3.9E-01	—	—	9.7E+01	n	2.4E-01	n >S	2.4E+01	n >S	—	—	—	2.0E-01	
Simazine	122-34-9	3.9E+01	c	5.5E-02	m	5.5E+00	m	—	—	—	—	—	—	—	3.9E+01	c	2.8E-02	m	2.8E+00	m	—	—	—	—	
Sodium*	7440-23-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Sodium hypochlorite	7681-52-9	1.5E+04	n	—	—	—	—	—	—	—	—	—	—	—	1.4E+04	n	—	—	—	—	—	—	—	—	
Sodium polyacrylate	9003-04-7	1.2E+02	n	2.4E+01	n	2.4E+03	n	1.2E+02	n	3.0E+04	n	—	—	—	6.2E+01	n	1.2E+01	n	1.2E+03	n	6.2E+01	n	1.9E+03	n	
Strontium	7440-24-6	4.4E+04	n	6.1E+02	n	6.1E+04	n	—	—	—	—	—	—	—	4.4E+04	n	3.1E+02	n	3.1E+04	n	—	—	—	—	
Strychnine	57-24-9	2.0E+01	n	3.7E-02	n	3.7E+00	n	—	—	—	—	—	—	—	2.0E+01	n	1.9E-02	n	1.9E+00	n	—	—	—	—	
Styrene	100-42-5	6.7E+03	n	3.3E+00	m	3.3E+02	m	1.1E+04	n	4.9E+05	n >S	—	—	—	4.3E+03	n	1.6E+00	m	1.6E+02	m	5.8E+03	n	3.2E+04	n >S	
Sulfate*	14808-79-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Sulfide*	18496-25-8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Sulfolane	126-33-0	4.3E+02	n	6.1E-01	n	6.1E+01	n	8.6E+02	n	2.5E+05	n >S	—	—	—	2.9E+02	n	3.1E-01	n	3.1E+01	n	4.4E+02	n	1.6E+04	n >S	
Sulfur*	7704-34-9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Sulprofos (Bolstar)	35400-43-2	2.0E+02	n	7.5E+03	n >S	7.5E+05	n >S	—	—	—	—	—	—	—	2.0E+02	n	3.8E+03	n >S	3.8E+05	n >S	—	—	—	—	
Tebuconazole	107534-96-3	2.0E+03	n	3.1E+01	n	3.1E+03	n >S	—	—	—	—	—	—	—	2.0E+03	n	1.6E+01	n	1.6E+03	n >S	—	—	—	—	
Tebuthiuron	34014-18-1	4.7E+03	n	5.4E+00	n	5.4E+02	n	—	—	—	—	—	—	—	4.7E+03	n	2.7E+00	n	2.7E+02	n	—	—	—	—	
Terbufos	13071-79-9	1.7E+00	n	3.4E-01	n	3.4E+01	n	—	—	—	—	—	—	—	1.7E+00	n	1.7E-01	n	1.7E+01	n	—	—	—	—	
Tert-amyl ethyl ether (TAE)	919-94-8	3.3E+03	n	9.5E+00	n	9.5E+02	n	—	—	—	—	—	—	—	3.3E+03	n	4.7E+00	n	4.7E+02	n	—	—	—	—	
Tert-amyl-methyl ether (TAME)	994-05-8	3.3E+03	n	3.8E+00	n	3.8E+02	n	—	—	—	—	—	—	—	3.3E+03	n	1.9E+00	n	1.9E+02	n	—	—	—	—	
Tert-butyl alcohol (2-methyl-2-propanol)	75-65-0	7.4E+03	n	4.6E+00	n	4.6E+02	n	—	—	—	—	—	—	—	7.4E+03	n	2.3E+00	n	2.3E+02	n	—	—	—	—	
Tetrachlorobenzene, 1,2,3,4-	634-66-2	2.0E+01	n	1.2E+01	n	1.2E+03	n	—	—	—	—	—	—	—	2.0E+01	n	6.0E+00	n	6.0E+02	n	—	—	—	—	
Tetrachlorobenzene, 1,2,3,5-	634-90-2	1.3E+01	n	1.9E+00	n	1.9E+02	n	—	—	—	—	—	—	—	1.3E+01	n	9.4E-01	n	9.4E+01	n	—	—	—	—	
Tetrachlorobenzene, 1,2,4,5-	95-94-3	2.0E+01	n	4.8E-01	n	4.8E+01	n >S	—	—	—	—	—	—	—	2.0E+01	n	2.4E-01	n	2.4E+01	n >S	—	—	—	—	

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

Last Revised: November 12, 2014

		0.5 acre source area										30 acre source area																
Chemical of Concern		CAS	Soil <sub>Comb</sub> <sup>2</sup> (mg/kg) note <sup>3</sup>		Soil <sub>Ing</sub> (mg/kg) note <sup>3</sup>		Soil <sub>Class 3</sub> (mg/kg) note <sup>3</sup>		Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg) note <sup>3</sup>		GW- Soil <sub>Inh-V</sub> (mg/kg) note <sup>3</sup>		Soil for Secondary MCL (mg/kg)		Soil <sub>Comb</sub> <sup>2</sup> (mg/kg) note <sup>3</sup>		Soil <sub>Ing</sub> (mg/kg) note <sup>3</sup>		Soil <sub>Class 3</sub> (mg/kg) note <sup>3</sup>		Soil <sub>Inh-V</sub> <sup>4</sup> (mg/kg) note <sup>3</sup>		GW- Soil <sub>Inh-V</sub> (mg/kg) note <sup>3</sup>		Soil for Secondary MCL (mg/kg)			
Tetrachloroethane, 1,1,1,2-	630-20-6	6.5E+01	c	1.4E+00	c	1.4E+02	c	9.1E+01	c	4.5E+03	c	—	3.9E+01	c	7.1E-01	c	7.1E+01	c	4.7E+01	c	2.9E+02	c	—	—	—	—	—	—
Tetrachloroethane, 1,1,2,2-	79-34-5	3.0E+01	c	2.3E-02	c	2.3E+00	c	—	—	—	—	—	3.0E+01	c	1.2E-02	c	1.2E+00	c	—	—	—	—	—	—	—	—	—	
Tetrachloroethylene	127-18-4	7.1E+02	c	5.0E-02	m	5.0E+00	m	9.4E+02	c	5.0E+03	c >S	—	4.2E+02	c	2.5E-02	m	2.5E+00	m	4.8E+02	c	3.2E+02	c	—	—	—	—	—	
Tetrachlorophenol, 2,3,4,5-	4901-51-3	4.0E+02	n	1.5E+01	n	1.5E+03	n	—	—	—	—	—	4.0E+02	n	7.4E+00	n	7.4E+02	n	—	—	—	—	—	—	—	—	—	
Tetrachlorophenol, 2,3,4,6-	58-90-2	1.8E+02	n	4.5E+00	n	4.5E+02	n	—	—	—	—	—	1.8E+02	n	2.2E+00	n	2.2E+02	n	—	—	—	—	—	—	—	—	—	
Tetrachlorophenol, 2,3,5,6-	935-95-5	2.3E+01	n	2.2E+00	n	2.2E+02	n >S	—	—	—	—	—	2.3E+01	n	1.1E+00	n	1.1E+02	n >S	—	—	—	—	—	—	—	—	—	
Tetrachlorovinphos (Stirophos)	22248-79-9	2.6E+03	n	2.4E+03	n	2.4E+05	n >S	—	—	—	—	—	2.6E+03	n	1.2E+03	n	1.2E+05	n >S	—	—	—	—	—	—	—	—	—	
Tetradifon	116-29-0	1.0E+03	n	8.7E+01	n	8.7E+03	n >S	—	—	—	—	—	1.0E+03	n	4.4E+01	n	4.4E+03	n >S	—	—	—	—	—	—	—	—	—	
Tetraethyl dithiopyrophosphate (sulfotep)	3689-24-5	3.3E+01	n	3.9E-01	n	3.9E+01	n	—	—	—	—	—	3.3E+01	n	1.9E-01	n	1.9E+01	n	—	—	—	—	—	—	—	—	—	
Tetraethyl lead	78-00-2	6.7E-03	n	5.0E-04	n	5.0E-02	n	—	—	—	—	—	6.7E-03	n	2.5E-04	n	2.5E-02	n	—	—	—	—	—	—	—	—	—	
Tetraethyl pyrophosphate (TEPP)	107-49-3	7.3E-01	n	9.3E-03	n	9.3E-01	n	—	—	—	—	—	7.3E-01	n	4.6E-03	n	4.6E-01	n	—	—	—	—	—	—	—	—	—	
Tetraethylene glycol	112-60-7	2.2E+04	n	1.6E+01	n	1.6E+03	n	—	—	—	—	—	2.2E+04	n	7.8E+00	n	7.8E+02	n	—	—	—	—	—	—	—	—	—	
Tetrahydrofuran	109-99-9	1.5E+02	c	2.5E-01	c	2.5E+01	c	1.9E+02	c	4.6E+03	c	—	8.6E+01	c	1.2E-01	c	1.2E+01	c	9.7E+01	c	3.0E+02	c	—	—	—	—	—	
Tetrahydropyran	142-68-7	1.6E+02	c	2.7E-01	c	2.7E+01	c	2.0E+02	c	5.9E+03	c	—	9.2E+01	c	1.4E-01	c	1.4E+01	c	1.0E+02	c	3.8E+02	c	—	—	—	—	—	
Tetraoxadodecane, 2,5,8,11-	112-49-2	1.7E+03	n	1.7E+00	n	1.7E+02	n	—	—	—	—	—	1.7E+03	n	8.6E-01	n	8.6E+01	n	—	—	—	—	—	—	—	—	—	
Thallium and compounds (as thallium chloride)	7791-12-0	6.3E+00	n	1.7E+00	m	1.7E+02	m	—	—	—	—	—	6.3E+00	n	8.7E-01	m	8.7E+01	m	—	—	—	—	—	—	—	—	—	
Thiofanox	39196-18-4	2.0E+01	n	3.1E-02	n	3.1E+00	n	—	—	—	—	—	2.0E+01	n	1.6E-02	n	1.6E+00	n	—	—	—	—	—	—	—	—	—	
Thionazin	297-97-2	4.7E+00	n	1.1E-02	n	1.1E+00	n	—	—	—	—	—	4.7E+00	n	5.5E-03	n	5.5E-01	n	—	—	—	—	—	—	—	—	—	
Thiophanate-methyl	23564-05-8	5.3E+03	n	4.5E+00	n	4.5E+02	n >S	—	—	—	—	—	5.3E+03	n	2.2E+00	n	2.2E+02	n >S	—	—	—	—	—	—	—	—	—	
Thiram	137-26-8	3.3E+02	n	3.5E+00	n	3.5E+02	n	—	—	—	—	—	3.3E+02	n	1.8E+00	n	1.8E+02	n	—	—	—	—	—	—	—	—	—	
Tin	7440-31-5	3.5E+04	n	3.7E+04	n >S	1.0E+06	n >S	—	—	—	—	—	3.5E+04	n	1.8E+04	n >S	1.0E+06	n >S	—	—	—	—	—	—	—	—	—	
Titanium	7440-32-6	2.2E+05	n	—	—	—	—	—	—	—	—	—	2.2E+05	n	—	—	—	—	—	—	—	—	—	—	—	—	—	
Toluene	108-88-3	5.9E+03	n	8.2E+00	m	8.2E+02	m	6.3E+04	n	5.2E+05	n >S	—	5.4E+03	n	4.1E+00	m	4.1E+02	m	3.2E+04	n	3.4E+04	n >S	—	—	—	—	—	
Toluene diisocyanate, 2,4/2,6-	26471-62-5	1.5E+02	n	—	—	—	—	1.5E+02	n	1.7E+05	n	—	7.5E+01	n	—	—	—	7.5E+01	n	1.1E+04	n	—	—	—	—	—	—	
Toluenediamine, 2,4-	95-80-7	1.5E+00	c	1.5E-02	c	1.5E+00	c	—	—	—	—	—	1.5E+00	c	7.6E-03	c	7.6E-01	c	—	—	—	—	—	—	—	—	—	
Toluenediamine, 2,6-	823-40-5	2.0E+03	n	1.4E+00	n	1.4E+02	n	—	—	—	—	—	2.0E+03	n	7.2E-01	n	7.2E+01	n	—	—	—	—	—	—	—	—	—	
Toluidine, o-	95-53-4	4.7E+01	c	5.8E-01	c	5.8E+01	c	1.4E+02	c	2.7E+04	c	—	3.5E+01	c	2.9E-01	c	2.9E+01	c	7.1E+01	c	1.7E+03	c	—	—	—	—	—	
Toluidine, p-	106-49-0	7.1E+01	c	8.9E-02	c	8.9E+00	c	—	—	—	—	—	7.1E+01	c	4.4E-02	c	4.4E+00	c	—	—	—	—	—	—	—	—	—	
Toxaphene	8001-35-2	1.2E+00	c	1.2E+01	m	1.2E+03	m	9.6E+02	c	1.0E+06	c >S	—	1.2E+00	c	5.8E+00	m	5.8E+02	m	4.9E+02	c	4.4E+05	c >S	—	—	—	—	—	
TPH, TX1005, C6-C12	NA	1.6E+03	n	6.5E+01	n	6.5E+03	n >S	3.1E+03	n	1.2E+05	n >S	—	1.1E+03	n	3.3E+01	n	3.3E+03	n >S	1.6E+03	n	7.6E+03	n >S	—	—	—	—	—	
TPH, TX1005, >C12-C28	NA	2.3E+03	n	2.0E+02	n	2.0E+04	n >S	1.5E+04	n	1.0E+06	n >S	—	2.0E+03	n	9.9E+01	n	9.9E+03	n >S	7.8E+03	n	9.8E+04	n >S	—	—	—	—	—	
TPH, TX1005, >C12-C35	NA	2.3E+03	n	2.0E+02	n	2.0E+04	n >S	1.5E+04	n	1.0E+06	n >S	—	2.0E+03	n	9.9E+01	n	9.9E+03	n >S	7.8E+03	n	9.8E+04	n >S	—	—	—	—	—	
TPH, TX1005, >C28-C35	NA	2.3E+03	n	2.0E+02	n	2.0E+04	n >S	1.5E+04	n	1.0E+06	n >S	—	2.0E+03	n	9.9E+01	n	9.9E+03	n >S	7.8E+03	n	9.8E+04	n >S	—	—	—	—	—	
TP Silvex, 2,4,5-	93-72-1	5.3E+02	n	5.3E+00	m	5.3E+02	m	—	—	—	—	—	5.3E+02	n	2.6E+00	m	2.6E+02	m	—	—	—	—	—	—	—	—	—	
Triadimenol	55219-65-3	2.0E+03	n	8.4E+00	n	8.4E+02	n	—	—	—	—	—	2.0E+03	n	4.2E+00	n	4.2E+02	n	—	—	—	—	—	—	—	—	—	
Triallate	2303-17-5	3.2E+02	n	1.9E+01	n	1.9E+03	n >S	—	—	—	—	—	3.2E+02	n	9.5E+00	n	9.5E+02	n >S	—	—	—	—	—	—	—	—	—	
Triaminotribrobenzene (TATB)	3058-38-6	1.6E+02	c	6.4E-02	c	6.4E+00	c	—	—	—	—	—	1.6E+02	c	3.2E-02	c	3.2E+00	c	—	—	—	—	—	—	—	—	—	
Tributyltin oxide	56-35-9	2.0E+01	n	—	—	—	—	—	—	—	—	—	2.0E+01	n	—	—	—	—	—	—	—	—	—	—	—	—	—	
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	3.9E+05	n	8.0E+04	n >S	1.0E+06	n >S	4.6E+05	n	1.0E+06	n >S	—	2.2E+05	n	4.0E+04	n >S	1.0E+06	n >S	2.4E+05	n	6.5E+04	n >S	—	—	—	—	—	
Trichlorobenzene, 1,2,3-	87-61-6	1.2E+02	n	2.6E+01	n	2.6E+03	n	3.0E+02	n	4.8E+04	n >S	—	8.7E+01	n	1.3E+01	n	1.3E+03	n	1.6E+02	n	3.1E+03	n >S	—	—	—	—	—	
Trichlorobenzene, 1,2,4-	120-82-1	1.2E+02	n	4.8E+00	m	4.8E+02	m	1.5E+02	n	1.1E+04	n >S	—	7.0E-01	n	2.4E+00	m	2.4E+02	m	7.8E+01	n	6.9E+02	n	—	—	—	—	—	
Trichlorobenzene, 1,3,5-	108-70-3	7.8E+01	n	7.5E+00	n	7.5E+02	n	1.3E+02	n	1.0E+04	n >S	—	4.9E+01	n	3.7E+00	n	3.7E+02	n	6.5E+01	n	6.7E+02	n	—	—	—	—	—	
Trichloroethane, 1,1,1-	71-55-6	5.3E+04	n	1.6E+00	m	1.6E+02	m	7.8E+04	n	3.3E+05	n >S	—	3.2E+04	n	8.1E-01	m	8.1E+01	m	4.0E+04	n	2.1E+04	n >S	—	—	—	—	—	
Trichloroethane, 1,1,2-	79-00-5	1.8E+01	c	2.0E-02	m	2.0E+00	m	2.2E+01	c	3.2E+02	c	—	1.0E+01	c	1.0E-02	m	1.0E+00	m	1.2E+01	c	2.1E+01	c	—	—	—	—	—	
Trichloroethylene	79-01-6	1.8E+01	n	3.4E-02	m	3.4E+00	m	3.1E+01	n	1.6E+02	n	—	1.1E+01	n	1.7E-02	m	1.7E+00	m	1.6E+01	n	1.0E+01	n	—	—	—	—	—	
Trichlorofluoromethane	75-69-4	2.5E+04	n	1.3E+02	n	1.3E+04	n	—	—	—	—	—	2.5E+04	n	6.4E+01	n	6.4E+03	n	—	—	—	—	—	—	—	—		
Trichloronate	327-98-0	1.4E+02	n	1.2E+02	n	1.2E																						

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

Last Revised: November 12, 2014

		0.5 acre source area										30 acre source area															
Chemical of Concern		CAS	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Air <sub>Soil<sub>inh-V</sub></sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Air/GW- Soil <sub>inh-V</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil for Secondary MCL (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Comb</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Ing</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil <sub>Class 3</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Air <sub>Soil<sub>inh-V</sub></sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Air/GW- Soil <sub>inh-V</sub> (mg/kg)	<sup>2</sup> note <sup>3</sup>	<sup>1</sup> Soil for Secondary MCL (mg/kg)	<sup>2</sup> note <sup>3</sup>	
Trichlorophenol, 2,4,6-	88-06-2	6.7E+01	n	1.7E-01	n	1.7E+01	n	2.0E+03	c	3.5E+05	c > S	—	—	6.7E+01	n	8.7E-02	n	8.7E+00	n	1.0E+03	c	2.3E+04	c > S	—	—	—	—
Trichlorophenol, 3,4,5-	609-19-8	6.7E+03	n	3.3E+02	n	3.3E+04	n	—	—	—	—	—	—	6.7E+03	n	1.6E+02	n	1.6E+04	n	—	—	—	—	—	—	—	—
Trichlorophenoxyacetic acid, 2,4,5-	93-76-5	6.7E+02	n	9.9E-01	n	9.9E+01	n	—	—	—	—	—	—	6.7E+02	n	4.9E-01	n	4.9E+01	n	—	—	—	—	—	—	—	—
Trichloropropane, 1,1,2-	598-77-6	4.6E+00	n	1.5E+00	n	1.5E+02	n	4.6E+00	n	3.2E+01	n	—	—	2.4E+00	n	7.3E-01	n	7.3E+01	n	2.4E+00	n	2.1E+00	n	—	—	—	—
Trichloropropane, 1,2,3-	96-18-4	2.0E-01	c	5.3E-04	c	5.3E-02	c	1.4E+01	n	5.7E+02	n	—	—	2.0E-01	c	2.7E-04	c	2.7E-02	c	7.2E+00	n	3.7E+01	n	—	—	—	—
Triethanolamine	102-71-6	1.3E+04	n	9.4E+00	n	9.4E+02	n	—	—	—	—	—	—	1.3E+04	n	4.7E+00	n	4.7E+02	n	—	—	—	—	—	—	—	—
Triethylamine	121-44-8	1.1E+02	n	—	—	—	—	1.1E+02	n	1.6E+03	n	—	—	5.5E+01	n	—	—	—	—	5.5E+01	n	1.0E+02	n	—	—	—	—
Triethylene glycol	112-27-6	2.0E+05	n	1.4E+02	n	1.4E+04	n	—	—	—	—	—	—	2.0E+05	n	7.0E+01	n	7.0E+03	n	—	—	—	—	—	—	—	—
Triethylphosphorothioate, O, O, O-	126-68-1	5.5E-01	n	4.4E-03	n	4.4E-01	n	—	—	—	—	—	—	5.5E-01	n	2.2E-03	n	2.2E-01	n	—	—	—	—	—	—	—	—
Trifluralin	1582-09-8	2.7E+02	c	6.5E+01	c	6.5E+03	c > S	—	—	—	—	—	—	2.7E+02	c	3.3E+01	c	3.3E+03	c > S	—	—	—	—	—	—	—	—
Trimethylamine	75-50-3	1.5E+02	n	—	—	—	—	1.5E+02	n	4.4E+03	n	—	—	7.6E+01	n	—	—	—	—	7.6E+01	n	2.8E+02	n	—	—	—	—
Trimethylbenzene, 1,2,3-	526-73-8	1.2E+02	n	3.2E+01	n	3.2E+03	n > S	1.2E+02	n	4.9E+03	n > S	—	—	6.1E+01	n	1.6E+01	n	1.6E+03	n > S	6.2E+01	n	3.1E+02	n	—	—	—	—
Trimethylbenzene, 1,2,4-	95-63-6	1.5E+02	n	4.9E+01	n	4.9E+03	n > S	1.6E+02	n	7.5E+03	n > S	—	—	7.9E+01	n	2.4E+01	n	2.4E+03	n > S	8.1E+01	n	4.9E+02	n	—	—	—	—
Trimethylbenzene, 1,3,5-	108-67-8	1.1E+02	n	5.3E+01	n	5.3E+03	n > S	1.2E+02	n	5.5E+03	n > S	—	—	5.9E+01	n	2.7E+01	n	2.7E+03	n > S	6.0E+01	n	3.5E+02	n	—	—	—	—
Trinitrobenzene, 1,3,5-	99-35-4	2.0E+03	n	1.8E+00	n	1.8E+02	n	—	—	—	—	—	—	2.0E+03	n	9.1E-01	n	9.1E+01	n	—	—	—	—	—	—	—	—
Trinitrophenylmethylnitramine (tetryl; nitramine)	479-45-8	1.5E+02	n	5.5E-01	n	5.5E+01	n	—	—	—	—	—	—	1.5E+02	n	2.8E-01	n	2.8E+01	n	—	—	—	—	—	—	—	—
Trinitrotoluene, 2,4,6-	118-96-7	3.3E+01	n	1.7E-01	n	1.7E+01	n	—	—	—	—	—	—	3.3E+01	n	8.6E-02	n	8.6E+00	n	—	—	—	—	—	—	—	—
Uranium (soluble salts)	7440-61-1	2.2E+02	n	1.8E+03	m > S	1.8E+05	m > S	—	—	—	—	—	—	2.2E+02	n	8.9E+02	m > S	8.9E+04	m > S	—	—	—	—	—	—	—	—
Valeric acid (pentanoic acid)	109-52-4	1.3E+02	n	2.3E+01	n > S	2.3E+03	n > S	1.3E+02	n	3.8E+04	n > S	—	—	6.8E+01	n	1.2E+01	n > S	1.2E+03	n > S	6.8E+01	n	2.5E+03	n > S	—	—	—	—
Vanadium	7440-62-2	7.6E+01	n	8.8E+02	n > S	8.8E+04	n > S	—	—	—	—	—	—	7.5E+01	n	4.4E+02	n > S	4.4E+04	n > S	—	—	—	—	—	—	—	—
Vernam	1929-77-7	6.7E+01	n	2.7E+00	n	2.7E+02	n	—	—	—	—	—	—	6.7E+01	n	1.4E+00	n	1.4E+02	n	—	—	—	—	—	—	—	—
Vinyl acetate	108-05-4	3.0E+03	n	5.3E+01	n	5.3E+03	n	3.1E+03	n	3.1E+04	n	—	—	1.5E+03	n	2.7E+01	n	2.7E+03	n	1.6E+03	n	2.0E+03	n	—	—	—	—
Vinyl chloride	75-01-4	3.7E+00	c	2.2E-02	m	2.2E+00	m	4.3E+01	c	4.2E+01	c	—	—	3.4E+00	c	1.1E-02	m	1.1E+00	m	2.2E+01	c	2.7E+00	c	—	—	—	—
Vinylcyclohexane	695-12-5	4.1E+04	n	1.4E+03	n > S	1.4E+05	n > S	—	—	—	—	—	—	4.1E+04	n	7.1E+02	n > S	7.1E+04	n > S	—	—	—	—	—	—	—	—
Warfarin	81-81-2	2.0E+01	n	2.8E-01	n	2.8E+01	n	—	—	—	—	—	—	2.0E+01	n	1.4E-01	n	1.4E+01	n	—	—	—	—	—	—	—	—
Xylene, m-	108-38-3	8.9E+03	n	1.1E+02	m	1.1E+04	m > S	9.4E+03	n	1.1E+05	n > S	—	—	4.7E+03	n	5.3E+01	m	5.3E+03	m > S	4.8E+03	n	7.2E+03	n > S	—	—	—	—
Xylene, o-	95-47-6	4.8E+04	n	7.1E+01	m	7.1E+03	m > S	6.8E+04	n	1.0E+06	n > S	—	—	2.9E+04	n	3.5E+01	m	3.5E+03	m > S	3.5E+04	n	3.5E+05	n > S	—	—	—	—
Xylene, p-	106-42-3	8.9E+03	n	1.5E+02	m	1.5E+04	m > S	9.4E+03	n	1.4E+05	n > S	—	—	4.7E+03	n	7.5E+01	m	7.5E+03	m > S	4.8E+03	n	9.1E+03	n > S	—	—	—	—
Xylenes	1330-20-7	6.0E+03	n	1.2E+02	m	1.2E+04	m > S	9.4E+03	n	1.3E+05	n > S	—	—	3.7E+03	n	6.1E+01	m	6.1E+03	m > S	4.8E+03	n	8.1E+03	n > S	—	—	—	—
Zinc	7440-66-6	9.9E+03	n	2.4E+03	n > S	2.4E+05	n > S	—	—	—	—	1.6E+03	n	9.9E+03	n	1.2E+03	n > S	1.2E+05	n > S	—	—	—	—	—	8.0E+02	—	—
6 C aliphatics (TPH) (>53% n-hexane content)	NA	3.3E+03	n	1.7E+02	n	1.7E+04	n > S	1.0E+04	n	1.2E+04	n > S	—	—	2.5E+03	n	8.6E+01	n	8.6E+03	n > S	5.3E+03	n	8.1E+02	n	—	—	—	—
6 C aliphatics (TPH) (<53% n-hexane content)	NA	4.8E+03	n	1.7E+02	n	1.7E+04	n > S	2.8E+05	n	3.4E+05	n > S	—	—	4.8E+03	n	8.6E+01	n	8.6E+03	n > S	1.5E+05	n	2.2E+04	n > S	—	—	—	—
>6-8 C aliphatics (TPH) (>53% n-hexane content)	NA	3.3E+03	n	4.2E+02	n	4.2E+04	n > S	1.0E+04	n	2.0E+04	n > S	—	—	2.5E+03	n	2.1E+02	n	2.1E+04	n > S	5.3E+03	n	1.3E+03	n > S	—	—	—	—
>6-8 C aliphatics (TPH) (<53% n-hexane content)	NA	4.8E+03	n	4.2E+02	n	4.2E+04	n > S	2.8E+05	n	5.6E+05	n > S	—	—	4.8E+03	n	2.1E+02	n	2.1E+04	n > S	1.5E+05	n	3.6E+04	n > S	—	—	—	—
>8-10 C aliphatics (TPH)	NA	4.0E+03	n	3.6E+03	n > S	3.6E+05	n > S	7.7E+03	n	4.8E+04	n > S	—	—	2.7E+03	n	1.8E+03	n > S	1.8E+05	n > S	3.9E+03	n	3.1E+03	n > S	—	—	—	—
>10-12 C aliphatics (TPH)	NA	3.6E+03	n	2.5E+04	n > S	1.0E+06	n > S	7.7E+03	n	2.3E+05	n > S	—	—	2.5E+03	n	1.3E+04	n > S	1.0E+06	n > S	3.9E+03	n	1.5E+04	n > S	—	—	—	—
>12-16 C aliphatics (TPH)	NA	4.3E+03	n	4.9E+05	n > S	1.0E+06	n > S	1.2E+04	n	1.0E+06	n > S	—	—	3.2E+03	n	2.5E+05	n > S	1.0E+06	n > S	6.2E+03	n	6.6E+04	n > S	—	—	—	—
>16-21 C aliphatics (TPH)	NA	1.3E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	1.3E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	—	—
>16-21 C aliphatics (TPH) (for transformer mineral oil releases only)	NA	1.1E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	1.1E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	—	—
>21-35 C aliphatics (TPH)	NA	1.3E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	1.3E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	—	—
>21-35 C aliphatics (TPH) (for transformer mineral oil releases only)	NA	1.1E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	1.1E+05	n	1.0E+06	n > S	1.0E+06	n > S	—	—	—	—	—	—	—	—
>7-8 C aromatics (TPH)	NA	6.4E+03	n	2.0E+01	n	2.0E+03	n	2.9E+04	n	2.4E+05	n > S	—	—	5.3E+03	n	1.0E+01	n	1.0E+03	n	1.5E+04	n	1.6E+04	n > S	—	—	—	—
>8-10 C aromatics (TPH)	NA	1.6E+03	n	6.5E+01	n	6.5E+03	n > S	3.1E+03	n	1.2E+05	n > S	—	—	1.1E+03	n	3.3E+01	n	3.3E+03	n > S	1.6E+03	n	7.6E+03	n > S	—	—	—	—
>10-12 C aromatics (TPH)	NA	1.9E+03	n	1.0E+02	n	1.0E+04	n > S	6.6E+03	n	4.4E+05	n > S	—	—	1.5E+03	n	5.0E+01	n	5.0E+03	n > S								

Footnotes

**Table 1**  
**Tier 1 Residential Soil PCLs<sup>1</sup>**

**Last Revised: November 12, 2014**

		0.5 acre source area						30 acre source area					
Chemical of Concern	CAS	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg) note <sup>3</sup>	GWSoil <sub>Ing</sub> (mg/kg) note <sup>3</sup>	GWSoil <sub>Class 3</sub> (mg/kg) note <sup>3</sup>	AirSoil <sub>I<sub>nh-V</sub></sub> <sup>4</sup> (mg/kg) note <sup>3</sup>	Air/GW- Soil <sub>I<sub>nh-V</sub></sub> (mg/kg) note <sup>3</sup>	GWSoil for Secondary MCL (mg/kg)	TotSoil <sub>Comb</sub> <sup>2</sup> (mg/kg) note <sup>3</sup>	GWSoil <sub>Ing</sub> (mg/kg) note <sup>3</sup>	GWSoil <sub>Class 3</sub> (mg/kg) note <sup>3</sup>	AirSoil <sub>I<sub>nh-V</sub></sub> <sup>4</sup> (mg/kg) note <sup>3</sup>	Air/GW- Soil <sub>I<sub>nh-V</sub></sub> (mg/kg) note <sup>3</sup>	GWSoil for Secondary MCL (mg/kg)
<sup>1</sup> In accordance with §350.72(b), when establishing Tier 1 PCLs for individual COCs for each of the individual and combined human health exposure pathways, the person must evaluate whether the PCLs need to be adjusted to lower concentrations to meet the cumulative carcinogenic risk level and hazard index criteria specified in §350.72(c). For COCs which exhibit both carcinogenic and noncarcinogenic characteristics, they shall be evaluated as both a carcinogen and noncarcinogen when determining whether the PCL established for an individual COC for each of the individual and combined human health exposure pathways needs to be adjusted to a lower concentration to meet the cumulative risk and hazard criteria. The person shall then use the lower of the carcinogenic or noncarcinogenic PCL as the Tier 1 human health PCL. In other words, the Tier 1 PCLs provided in this table for an individual COC should not be used as the final Tier 1 human health PCL for any of the individual or combined exposure pathways in cases where there are more than 10 carcinogenic and/or more than 10 noncarcinogenic COCs within a source medium unless it can be demonstrated that further downward adjustment is not necessary to meet the cumulative risk and hazard criteria.													
<sup>2</sup> Combined includes inhalation; ingestion; dermal; vegetable consumption pathways													
<sup>3</sup> c = carcinogenic; n = noncarcinogenic; m = primary MCL-based; e = EPA Action Level-based; > S = solubility limit exceeded during calculation													
<sup>4</sup> For subsurface soils only													
<sup>5</sup> Asbestos URF and soil PCLs removed. Contact your TCEQ Project Manager if asbestos may be a chemical of concern													
<sup>6</sup> Please contact the TCEQ for assistance in determining a site-specific approach for <sup>GW</sup> Soil <sub>Ing</sub> values for these compounds.													
<sup>7</sup> Site-specific PCLs for mercury may vary based on the pH-dependent K <sub>d</sub> value (see Figure:30 TAC §350.73(f)(1)(C)).													
<sup>8</sup> Persons must use the value provided in the <sup>GW</sup> Soil for Secondary MCL* column of this table as the <sup>GW</sup> Soil PCL for MTBE if the conditions described in §350.74(f)(3) exist.													
* These compounds are not necessarily of concern from a human health standpoint, therefore calculation of human health-based values is not required. However, aesthetics and ecological criteria would still apply. See table entitled "Compounds for which Calculation of a Human Health PCL is Not Required" available on the TCEQ website at <a href="http://www.tceq.state.tx.us/remediation/trrp/trrp.html">http://www.tceq.state.tx.us/remediation/trrp/trrp.html</a> .													
<b>NA=Not applicable</b>													
<b>All values capped at 1E+06</b>													
This table shows the Residential Soil Protective Concentration Levels for both 0.5 acre and 30 acre source area													
End of table													





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Document Control No. FTBLISS-006

January 17, 2017

(b) (6)

Fort Worth District Corps of Engineers  
MIE Branch  
1645 S 101 E Ave  
Tulsa, OK 74128-4609

**RE: Final Project Management Plan  
Remedial Investigation/Feasibility Study  
for Area of Interest North of Castner Range  
Fort Bliss, Texas  
Contract No. W912DY-10-D-0027, Delivery Order No. DS01**

Dear (b) (6):

KEMRON Environmental Services, Inc. is pleased to submit the Fort Bliss Final Project Management Plan for your review and approval.

If you should have any questions or comments, please contact me at (b) (6) or (b) (6) at (b) (6).

Sincerely,

(b) (6)

KEMRON  
Project Manager

cc: Project File  
Distribution List

Enc: Final Project Management Plan

**Project Management Plan**  
**Remedial Investigation/Feasibility Study**  
**for Area of Interest North of Castner Range**  
**Fort Bliss, Texas**

**Contract Number: W912DY-10-D-0027 – Delivery Order: DS01**

**January 2017**

**Version: Final**

*Prepared for*

**U.S. Army Corps of Engineers, Tulsa District**  
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**404-636-0928**

**Approved by:**

(b) (6)



1/17/2017  
Date

1/17/2017  
Date

1/17/2017  
Date

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**Acronym List**

°F	degree Fahrenheit
amsl	above mean sea level
AOI	area of interest
APP	Accident Prevention Plan
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirements
BERA	baseline ecological risk assessment
BIP	blow-in-place
CD/DVD	compact disc/digital versatile disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLIN	contract line item number
KO	Contracting Officer
COR	Contracting Officer's Representative
CRP	Community Relations Plan
CSM	conceptual site model
CWM	chemical warfare material
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	digital geophysical mapping
DID	data item description
DoD	U.S. Department of Defense
DOT	U.S. Department Of Transportation
DQO	data quality objective
DU	decision unit
EDMS	electronic data management system
EM	Engineer Manual / electromagnetic
EMR	Experience Modification Rate
ELAP	Environmental Laboratory Accreditation Program
ESP	Explosives Site Plan
FS	feasibility study
FUDS	Formerly Used Defense Sites
GIS	geographical information system
GPS	global positioning system
HA	hazard assessment
HHRA	human health risk assessment
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IGD	Interim Guidance Document
IS	incremental sampling
IVS	instrument verification strip
KEMRON	KEMRON Environmental Services, Inc.
MC	munitions constituents
MD	munitions debris
MDAS	material documented as safe
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
MRSP	munitions response site prioritization protocol

MS/MSD	matrix spike/matrix spike duplicates
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIRIS	Naval Installation Restoration Information Solution
NTP	Notice to Proceed
OB/OD	open burn/open detonation
OESS	Ordnance and Explosives Safety Specialist
PAO	Public Affairs Officer
PCL	protective concentration level
PG	Professional Geologist
PIRS	Project Information Retrieval System
PLS	Professional Land Surveyor
PM	Project Manager
PMP	Project Management Plan / Project Management Professional
POC	point of contact
PP	Proposed Plan
PVC	polyvinyl chloride
PWS	performance work statement
QA	quality assurance
QASP	Quality Assurance Surveillance Plan
QC	quality control
QAPP	Quality Assurance Project Plan
QSM	Quality System Manual
RAB	Restoration Advisory Board
RDX	cyclonite
RI	remedial investigation
RSL	regional screening level
RTK	real-time kinematic
SARA	Superfund Amendments and Reauthorization Act of 1986
SEDD	staged electronic data deliverable
SOP	standard operating procedure
SSHP	Site Safety and Health Plan
SSL	soil screening level
SUXOS	Senior UXO Supervisor
TCEQ	Texas Commission on Environmental Quality
TNT	2,4,6-trinitrotoluene
TO	task order
TPP	technical project planning
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
USACE	U.S. Army Corps of Engineers
UTM	Universal Transverse Mercator
UXO	unexploded ordnance
UXOQCS	UXO QC Specialist
UXOSO	UXO Safety Officer
VSP	Visual Sample Plan
WERS	Worldwide Environmental Remediation Services

## **1. INTRODUCTION**

---

This Project Management Plan (PMP) describes the status, management, and response strategy related to U.S. Army Corps of Engineers (USACE), Huntsville District, performance-based contract W912DY-10-D-0027, task order (TO) DS01, and has been prepared in accordance with Data Item Description (DID) Worldwide Environmental Remediation Services (WERS)-018.01. USACE Tulsa District will execute TO DS01. TO DS01 relates to environmental-remediation services for area of interest (AOI) North of Castner Range, Fort Bliss in El Paso County, Texas.

### **1.1. Project Authorization**

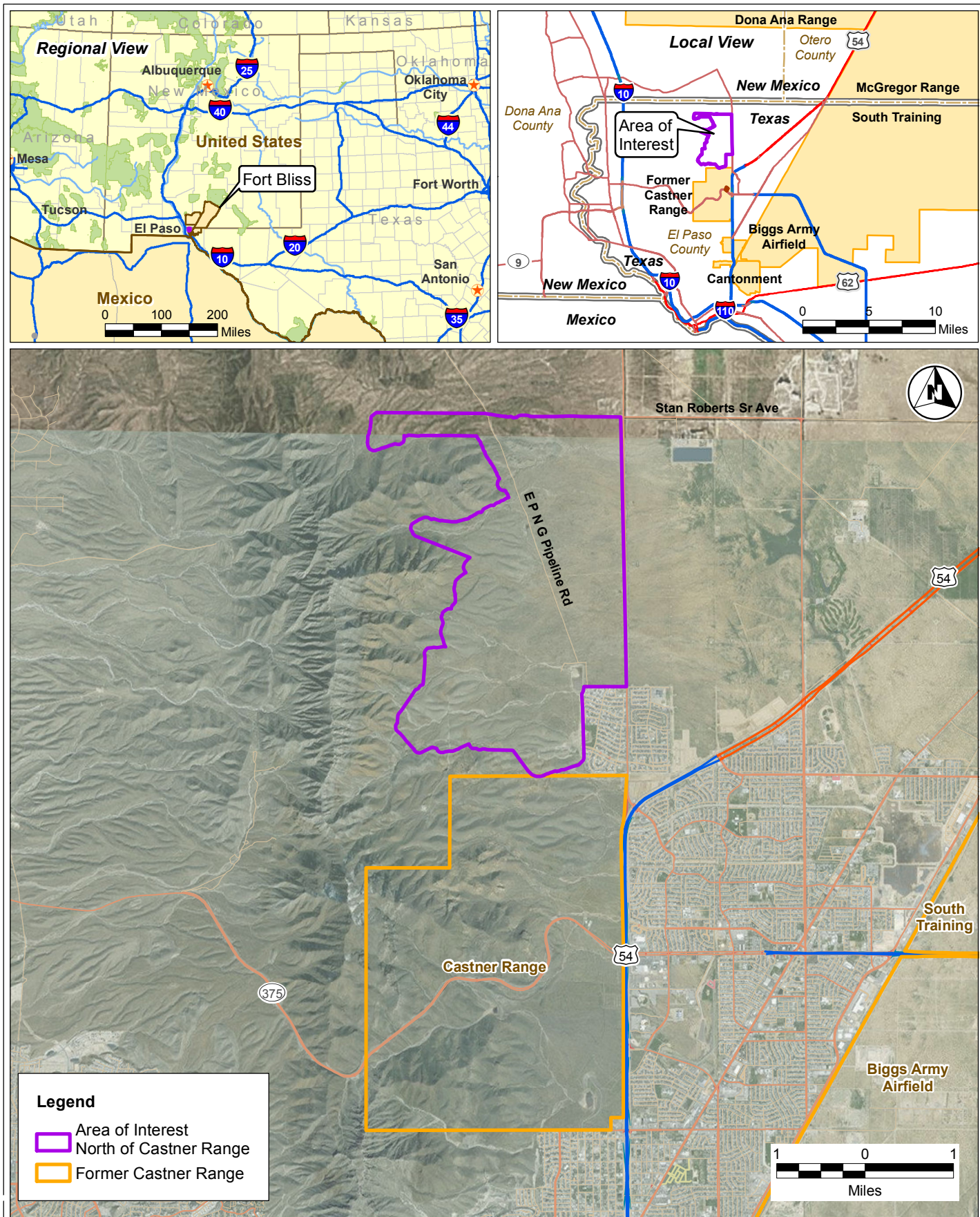
USACE is conducting environmental-response activities at the AOI North of Castner Range, Fort Bliss, site under the Defense Environmental Restoration Program - Military Munitions Response Program (DERP-MMRP). KEMRON Environmental Services, Inc. (KEMRON) will perform all work in accordance with federal, state, and local statutes, regulations, and guidance. The Texas Commission on Environmental Quality (TCEQ) and U.S. Environmental Protection Agency (EPA) Region 6 are the regulatory agencies for this site. TCEQ is the lead regulatory agency. As such, all associated work will be consistent with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR]§300) requirements, and under the state of Texas Voluntary Cleanup Program with regulatory coordination, as appropriate, of TCEQ. The AOI North of Castner Range is not on the National Priorities List.

The U.S. Department of Defense (DoD) established the MMRP to address military munitions located on current and formerly used defense sites (FUDS). Based on historical records and past work, this site may contain munitions and explosives of concern (MEC). MEC are: 1) unexploded ordnance (UXO), as defined in 10 U.S.C. 101(e)(5); 2) discarded military munitions, as defined in 10 U.S.C. 2710(e)(2); and/or 3) and munitions constituents (MC) (e.g., 2,4,6-trinitrotoluene [TNT]; octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine [HMX]; and cyclonite [RDX]) present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard.

### **1.2. Project Overview**

The AOI North of Castner Range is 4,909 acres in El Paso County, Texas. It is located north of the Closed Castner Range, not owned by Fort Bliss, and is bounded by Martin Luther King Boulevard on the east and the Franklin Mountains State Park on the west. Housing developments exist to the southeast and a quarry is in operation just north of the northern boundary. The buildings currently onsite include those related to ranching activities. The Archeology Museum and the Border Patrol Museum are located to the south, on the Closed Castner Range. The site location is shown in **Figure 1-1**.

The current project involves field work to collect data, a remedial investigation/feasibility study (RI/FS) based on the field work, and achieving stakeholder acceptance of a Proposed Plan (PP) and Decision Document (DD) for the 4,909-acre AOI North of Castner Range at Fort Bliss in El Paso County, Texas. There is also a task to erect fencing and signage around the Archeology Museum and Border Patrol Museum area located on the Closed Castner Range.



The objective of the RI is to build on previous work and includes the collection of appropriate data to characterize the nature and extent of MEC and MC at the site. An Explosives Site Plan (ESP) will be produced during the RI Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) preparation effort. The ESP and RI UFP-QAPP will be approved before field activity begins, in accordance with the schedule included in **Attachment A**.

Below is a list of deliverables required under TO DS01, as listed in the 16 June 2016 performance work statement (PWS) included in **Attachment B**.

- Project Management Plan
- Quality Assurance Surveillance Plan (QASP)
- Historical Records Report
- UFP-QAPP and Site Safety and Health Plan (SSHP)/Accident Prevention Plan (APP)
- Explosives Site Plan
- Community Relations Plan (CRP)
- Remedial Investigation Report
- Field/analytical data
- Feasibility Study Report
- Proposed Plan
- Decision Document.

KEMRON has reviewed and assessed the previous work carried out at the site and will perform historical record search and RI data collection at the sites in accordance with the four-phase USACE technical project planning (TPP) process described in Engineer Manual (EM) 200-1-2 (USACE, 2016). The TPP process involves four phases of planning activities that will accelerate project progress and result in a consensus decision among all project stakeholders. Phase I activities bring together a TPP team, composed of decision makers (Fort Bliss, USACE, regulators, and other stakeholders), to identify the current project and to document both short- and long-term project objectives. Phase II and Phase III provide a framework to develop data collection options for consideration during Phase IV. The project-specific data quality requirements established throughout the TPP process are then documented as data quality objectives during Phase IV.

### 1.2.1. History

There are no records showing ownership or use of the AOI by Fort Bliss; however, multiple munitions debris (MD) items were identified during a MEC reconnaissance survey completed by USACE, Huntsville District, from 2013-2015. The Army Environmental Command (AEC) indicated that the presence of MD occurred either from kick-out debris from an open burn/open detonation (OB/OD) area or from overshoot during training exercises in the Fort Bliss Closed Castner Range that borders the AOI. No MEC items were discovered during the reconnaissance. Additional site information will be available after performing the historical records search.

Current land uses at the site include private residences, ranching, and state park land. The area is currently owned by the state of Texas (Franklin Mountains State Park) and the city of El Paso, Texas.

### 1.2.2. Geographic and Environmental Setting

The AOI North of Castner Range is located in El Paso County, north of the Closed Castner Range and is not owned by Fort Bliss. The following sections provide additional information on the geographic and environmental setting.

### ***Climate***

El Paso, Texas, has a cold desert climate. Over the course of a year, the temperature typically varies from 32 degrees Fahrenheit (°F) to 97 °F and is rarely below 22 °F or above 104 °F. Over a year, the most common forms of precipitation are thunderstorms, light and moderate rain. Low humidity is typical in the winter and high humidity is common in the summer. The annual precipitation is 9- to 10-inches with very low average snowfall. The winds are usually light, with an annual velocity of 10 miles per hour.

### ***Topography***

El Paso County includes an irrigated valley along the Rio Grande; semiarid bench land east of the river locally referred to as “the mesa;” and two small mountain ranges, the Franklin Mountains in the northwestern part of the county and Huecos in the eastern part. El Paso has an average elevation of 3,800 feet above mean sea level (amsl). North Franklin Mountain is the highest peak in the city at 7,192 feet amsl. The average elevation at the AOI North of Castner Range is 4,180 feet amsl. The elevation slopes gently toward the north.

### ***Geology***

El Paso lies in the Basin and Range Physiographic Province in west Texas. This is an area of vast desert basins filled with sand and gravel and flanked by mountain ranges of bedrock that generally trend north or northwestward. The formations in the area range from Precambrian to Holocene in age. Precambrian rocks exposed include nearly 5,000 feet of metamorphosed sedimentary and volcanic rocks that have been intruded by granite. The Rio Grande river flows southeastward through the region in a valley between mountain ranges (Harbour, R.L., 1972).

### ***Hydrogeology***

The site is underlain by the Hueco bolson aquifer which is the principal aquifer in the El Paso area. It consists of an upper fluvial zone of mostly stream-channel and flood-plain deposits composed of silt, sand, gravel, and caliche; and a lower lacustrine zone containing mostly clay and silt. The maximum thickness is about 9,000 feet and occurs within a deep structural trough paralleling the east side of the Franklin Mountains. Recharge is principally from precipitation along the base of the Organ and Franklin mountains. Groundwater in the valley is under leaky artesian conditions. Water levels in the aquifer have been affected by extensive historical withdrawals which have caused major water-level declines. Depth to water ranges from about 350 feet near pumping centers to less than 100 feet elsewhere (Ashworth, John B., 1990).

### ***Ecology and Biological Resources***

The ecological and biological resources will be researched as part of the historical records search and will be included in the RI Report.

### ***Threatened, Sensitive and Special-Status Species***

Threatened, sensitive and special-status species will be researched as part of the historical records search and will be included in the RI Report.

### ***Cultural Resources***

Currently the Archaeology and Border Patrol Museums are located at the site. Additional cultural resources, if any, will be identified during as part of the historical records search and field investigation.

### ***Previous Response Activities and Investigation***

The only known previous investigation conducted at this site was a MEC reconnaissance survey completed by USACE in 2013 to 2015. Multiple MD items were identified; however, no MEC was discovered. A historical records search is tasked for this project and the information gained from the search will be included in the UFP-QAPP and future revisions to this document.

### **1.3. Performance Objective**

The performance objectives for this TO are Army and TCEQ approval of the following for the RI/FS for AOI North of Castner Range at Fort Bliss.

The primary goal of the TO efforts is to collect the appropriate amount of information necessary to:

- Characterize the nature and extent of MEC and MC;
- Evaluate the risks posed by MEC and MC to human health and environment; and
- Develop a decision document to mitigate risks, if present, posed by MEC and MC to human health and the environment.

### **1.4. Performance Payment Milestones**

This project includes the following eight major payment milestones.

1. Complete planning documents for AOI North of Castner Range.
2. Provide information to ensure community relations support.
3. Complete RI at AOI North of Castner Range.
4. Complete FS at AOI North of Castner Range.
5. Complete PP at AOI North of Castner Range.
6. Complete DD at AOI North of Castner Range.
7. Prepare and provide access to the Administrative Record for AOI North of Castner Range.
8. Complete fencing and signage for Archeology and Border Patrol museums area.

There are multiple minor milestone payments under each major milestone. Further discussion related to payment, invoice, and interim milestones are presented in **Section 4.8** and the Milestone Payment Schedule is presented in **Attachment C**.

### **1.5. Regulatory Process**

TCEQ and EPA Region 6 are the regulatory agencies for this site. TCEQ is the lead regulatory agency. As such, all associated work will be consistent with the provisions of CERCLA of 1980 as amended by SARA, and NCP (40CFR§300) requirements, and under the state of Texas Voluntary Cleanup Program with regulatory coordination, as appropriate, by TCEQ.

To perform munitions responses, DoD primarily follows CERCLA. However, CERCLA has no special provisions for dealing with explosives safety. DoD's Ammunition and Explosives Safety Standards (DoD, 2008) document will be adhered to in the investigation and remediation of sites with MEC.

### **1.6. Health and Safety Requirements**

Before beginning any fieldwork, KEMRON will implement a Safety and Health Program compliant with federal, state, and local laws and regulations and approved by the Contracting Officer's Representative (COR). This will include a written APP and SSHP, which will be a part of the UFP-QAPP prepared

before investigative activities. Details of the APP and SSHP are discussed in **Section 2.1.4**. KEMRON will ensure that its subcontractors, suppliers, and support personnel comply with the approved SSHP.

Additionally, KEMRON will adhere to all DoD policies, procedures, and regulations for munitions response. This includes but is not limited to Ammunition and Explosives Safety Standards (DoD, 2008); *The Army Safety Program* (U.S. Army, 2013); Department of the Army Pamphlet 385-63 (*Range Safety*; Department of the Army, 2014a); Department of the Army Pamphlet 385-64 (*Ammunition and Explosives Safety Standards*; Department of the Army, 2014b); USACE EM 385-1-97 (*Explosives–Safety and Health Requirements Manual*; USACE, 2013a); and USACE EM 385-1-1 (*Safety and Health Requirements Manual*, USACE, 2014). Chemical warfare material (CWM) is not expected at the site, however, if suspect CWM is encountered during any phase of the site activities, KEMRON will immediately halt operations and contact the COR for guidance.

All activities involving work in areas potentially containing MEC hazards will be conducted in full compliance with Department of Army, state, and local requirements regarding personnel, equipment, and procedures, and DoD standard operating procedures (SOPs) and safety regulations.

### **1.7. Additional Site Plans**

Before beginning any field work, KEMRON will prepare any additional plans or documents (e.g., sampling and analysis plans, quality assurance project plan, waste minimization plans, health and safety plans) consistent with the applicable regulatory drivers listed in Section 1.0 of the PWS, and any other agreements, orders, or regulations that apply to the installation and sites. These plans and documents will be subject to U.S. Army (Army) review and approval, through the Army's COR.

### **1.8. Quality Control**

Quality control (QC) will be provided whenever sampling or analysis for chemical constituents is required to achieve milestones. QC for geophysical and traditional soils or geotechnical testing, including any intrusive activities will also be included. All sampling and analysis will comply with the requirements of the most recently approved DoD Quality Systems Manual (QSM; DoD, 2013). The selected laboratory (ies) are DoD Environmental Laboratory Accreditation Program (ELAP) certified or equivalent.

Initially, KEMRON will develop a QASP for this TO for use by the Army. The QASP will highlight key QC activities or events that the COR will use to determine when Army inspections can be conducted to assess progress toward and/or completion of milestones. In addition, KEMRON will develop and submit documentation of project-specific quality assurance (QA) and QC activities prepared in accordance with the UFP-QAPP. The government will review and return the quality systems documentation, with comments, indicating acceptance or rejection. If necessary, KEMRON will revise the documentation to address all comments and submit the revised documentation to the government for acceptance. In addition, KEMRON will develop and submit Quality Control Summary Reports to summarize the QC details of the project. The problems and successes of the work done to control the quality of the chemical-measuring activities will be included in the summary reports.

## **2. PERFORMANCE OBJECTIVES**

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The following sections detail the activities planned for completion to meet the performance objectives of this TO. Specifically, as stated in Section 3.0 of the PWS, these objectives for the AOI North of Castner Range follow.

- Achieve Planning Documents
- Achieve Community Relations Support
- Achieve Remedial Investigation
- Achieve Feasibility Study
- Achieve approved Proposed Plan
- Achieve approved Decision Document
- Achieve Administrative Record
- Achieve fencing and signage for museum area.

### **2.1. Achieve Planning Documents**

KEMRON will work with stakeholders to complete the planning documents in accordance with all local, state, and federal regulations.

#### **2.1.1. Project Kick-off Meeting**

Within 30 days of project award, KEMRON will coordinate and attend a project kick-off meeting with the Army at Fort Bliss. Our Project Manager, Field Manager, and technical leads for geophysics and anomaly investigation will participate in the kick-off meeting. This will be used to establish Army expectations and project end-state objectives, further definition of project requirements, and an overview of project management approaches.

#### **2.1.2. Project Management Plan**

KEMRON will develop and maintain a PMP based on the schedule commitments cited in the PWS, which will establish a common understanding and framework for the planning, execution, and completion of the performance objectives. The PMP will cover the technical and management approach, project resources, schedule and payment milestone plan, meeting and reporting procedures, quality strategy, recordkeeping procedures, and community involvement during the project. A draft PMP (this submittal) will be submitted within 30 calendar days of contract award and will incorporate input from the project kick-off meeting on both the technical and management approach. The final PMP will be submitted within 30 calendar days following receipt of Army comments on the draft PMP.

#### **2.1.3. Quality Assurance Surveillance Plan**

KEMRON will prepare the QASP in accordance with the template in Attachment E of the PWS. The draft QASP will identify key tasks and highlight QC activities or events that the Army COR will use to determine how government inspections will be conducted to verify progress toward and/or completion of milestones. The draft QASP will be developed with the goal of monitoring contractor performance in accordance with the metrics set forth in the PWS documents such that the Army receives the quality of services called for in the contract and pays only for an acceptable level of services received. The draft QASP will be submitted concurrent with the draft PMP. The final QASP will be prepared by the government.

#### 2.1.4. UFP QAPP/Accident Prevention Plan/Site Safety Health Plan

KEMRON will prepare a work plan in the form of a UFP-QAPP that addresses all RI activities in accordance with WERS-001.01 and Interim Guidance Document (IGD 14-10), EM 200-1-15 (USACE, 2015), EM 385-1-1 (USACE, 2014), and EM 385-1-97 (USACE, 2013a). The UFP-QAPP will provide the RI objectives, available background information on the study area, an overview of the rationale and approach for the proposed field program, and detailed descriptions of the approach to any non-field RI activities (e.g., data analysis, fate and transport analysis, risk analysis). Details of the scope of the field program and investigative methods will also be covered in the UFP-QAPP.

KEMRON will use the 37 optimized UFP-QAPP worksheets that address all facets of the project to ensure that project objectives are achieved. The worksheets will allow the successful systematic application of the EPA seven-step data quality objective (DQO) planning process. The TPP process, as described below, will be used to develop and accelerate consensus on the DQOs and UFP-QAPP. The UFP-QAPP will include related sampling, analytical, data validation, and geophysical procedures, as well as QA/QC requirements. The sampling plan will be prepared in accordance with DID WERS-009.01 and EM 200-1-3 (USACE, 2001) and will address the contaminants of interest and media to be sampled. To ensure the completeness of the UFP-QAPP, KEMRON will include as appendices numerous site-adapted SOPs that detail critical processes and procedures for the project. The SOPs will cover all repetitive procedures for the site, ranging from geophysical data collection and processing methods to material potentially presenting an explosive hazard (MPPEH) evaluation and disposition procedures.

KEMRON will also prepare an APP and SSHP, in accordance with EM 385-1-1, to be appended to the UFP-QAPP. The APP will identify the general approach, methods, and operational procedures related to the safe execution of this TO. The SSHP will include site-specific information such as a site description and contaminant characteristics, safety and health hazard(s) assessment and risk analysis, safety and health staff organization and responsibilities, site-specific training and medical surveillance parameters per 29 CFR 1910.120(e) and (f), personal protective equipment, decontamination facilities and procedures, required monitoring and sampling, safety and health work precautions and procedures, site control measures, on-site first aid and emergency equipment, emergency response plans and contingency procedures (on site and off site), and documentation of necessary logs, reports, and records. KEMRON will require that all project personnel, including subcontractors, comply with the UFP-QAPP, APP, and SSHP.

#### 2.1.5. Explosives Site Plan

KEMRON will start preparing the ESP within 7 days of Notice to Proceed (NTP), which will be developed in accordance with AEC and USACE guidance. An ESP previously approved by USACE Huntsville will be used as a template to accelerate their review and approval. The ESP will provide a brief background on the AOI North of Castner Range, the planned scope of work, executing agencies, safety criteria, methods of disposal, explosive safety quantity distances, and fragmentation calculation data. A site map will be included to show the AOI boundaries and adjacent facilities, structures, utilities, transportation routes, and the location of planned demolition areas and corresponding exclusion zones. The exclusion zones will be based on the greatest fragmentation distance of the munitions potentially used at the Castner Range. The draft ESP will be submitted for concurrent reviews by USACE Tulsa and the Fort Bliss Range Safety Officer.

KEMRON does not intend to establish a separate magazine facility for donor explosives for this project, but will use a local explosives vendor to provide explosives on an as-needed basis to support the project. This will eliminate the potential for unauthorized access and injury, as well as minimize security costs.

### 2.1.6. Geographic Information System/Conceptual Site Model

KEMRON will perform a pre-RI geospatial data analysis to consolidate available site information pertinent to the RI into a geographic information system (GIS) with geospatial database. Examples of the types of information are the residences, inhabited structures, or public roadways within potential impact zones; topography; protected species or cultural resources, particularly in the state park land; and surface water bodies that could represent an environment pathway or receptor. The compilation of this information into a common geospatial system will be used to support the development of a conceptual site model (CSM), which in turn will provide the basis for refining the planned technical approach to be addressed at the first TPP meeting. The CSM will depict potential scenarios under which MEC could have been deposited within the AOI North of Castner Range, the areas most likely to contain MEC based on those scenarios, the initial conceptualization of potential MC-contamination presence and distribution, and the various site features that will affect RI field operations.

KEMRON will manage and submit the geospatial dataset in accordance with DID HNC-006 and in a format compatible with the Environmental Systems Research Institute (commonly known as ESRI) (ArcView/ArcInfo) system, version 9.x, for relay to the Project Development Team. GIS data capture will adhere with the installation's environmental management system. The data will be referenced to the Universal Transverse Mercator (UTM) coordinate system. KEMRON will submit GIS files by CD/DVD or ftp site to the USACE Tulsa District before the first TPP meeting, periodically during the project, at the completion of the RI field program, and upon project completion.

### 2.1.7. Historical Records Search

Because the source of contamination in the AOI is suspected to be either kick-out debris from the OB/OD area or from overshoot during training exercises in the Fort Bliss Closed Castner Range that borders the area to the south, KEMRON will perform a historical records search of the residential area in the southern portion of the AOI to determine if any MEC or related items were ever discovered or reported in that area. The purpose of the historical records search is to confirm the location of the OB/OD area, identify any range fans that could overlap the AOI, and determine the types of munitions used during these activities. Informational sources may include police and county sheriff records, documents from previous investigations, local newspaper articles, data on imported fill material, and construction records (via interviews with the builders of the residences, if identifiable and available). The search will also include records of the Fort Bliss Public Works, Real Property, Environmental, and Explosive Ordnance Disposal (or EOD) offices. Interviews will be held with knowledgeable persons and an internet search will be conducted for relevant information.

Pertinent documents will be scanned or copied, labeled with a distinct alphanumeric code, and entered into a searchable database. A summary of the information learned as well as references to any cited source documents will be provided in a separate report per the PWS.

The results of the historical records search will be used to develop the UFP-QAPP including refining the CSM and adjusting MEC and MC investigation activities.

### 2.1.8. Rights-of-Entries

As indicated in the PWS, USACE will obtain any rights-of-entry access required to complete the RI. KEMRON will assist USACE in obtaining any required rights-of-entry as necessary.

## **2.2. Achieve Community Relations Support**

### **2.2.1. Community Relations Plan**

There are many aspects of the investigation that are of interest to the public, especially those activities and decisions that have potential impacts on local communities. For example, the proximity of the site to residential neighborhoods could require notifications and evacuations during RI activities. Additionally, the location of the site on Franklin Mountains State Park land could require temporary closures of roads, trails, or camping areas. KEMRON will develop a Community Relations Plan (CRP) in accordance with the EPA *Superfund Community Involvement Toolkit* (EPA, 2002) to address these impacts and provide the public with accurate, timely, and understandable information and/or access to the information needed to understand the project as it moves forward. The CRP will serve as the foundation of the community involvement program for the RI of the AOI North of Castner Range. It will describe outreach activities to address community concerns and expectations about the site investigation and will assist in finding effective and appropriate ways to inform and engage the public. Outreach materials will be developed in English and Spanish versions to better serve the local community. In addition, the CRP, to be coordinated with the Fort Bliss Public Affairs Office (PAO) and USACE, will involve collecting, analyzing, and summarizing information about the site background, history, and suspected source of contamination and community geographic and demographic characteristics. A resource guide will be provided in the CRP that includes contact information for the project team, federal elected officials, and state elected officials, local government, media contacts, and directions on how to obtain additional information.

### **2.2.2. Public Meetings**

KEMRON will host two public meetings in the El Paso, Texas, area to inform and involve the local community. One public meeting will be held before field activities begin to inform the local community of the work to be performed. The second public meeting will be held after the completion of field activities to update the community on the results of the investigation. Notifications of the public meetings will be published in English and Spanish through channels described in the CRP, likely including direct mailings to Restoration Advisory Board (RAB) members and local residents as well as announcements in local English and Spanish newspapers such as the Fort Bliss *Bugle*, El Paso *Times*, and *El Diario* (in Juarez, Mexico).

KEMRON will prepare graphics, maps, posters, mailings, and handouts in coordination with the Fort Bliss PAO and USACE, and will submit these materials for review and comment 7 days before the public meeting. Meeting materials prepared for the general public will be provided in English and Spanish. Our Project Manager and lead technical personnel will also support the government in the presentation of materials and the question and answer sessions, as requested. KEMRON will provide translators as necessary and will electronically provide a short summary of the results of each meeting to relevant stakeholders within 7 days for review and approval.

## **2.3. Achieve Remedial Investigation at AOI North of Castner Range**

KEMRON's overall technical approach for the RI is to collect data of sufficient quantity and quality to satisfy the DQOs developed for the project, complete a MEC hazard assessment (HA) and updated munitions response site prioritization protocol (MRSP), and to support defensible removal/remedial decision making. KEMRON will follow the EPA's seven-step iterative process, defined in the EPA document *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4), (EPA, 2006); the U.S. Army Military Munitions Response Program *Munitions Response Remedial Investigation/Feasibility Study Guidance* (U.S. Army, 2009), and EM CX IGD 06-04 to develop DQOs

for determining the type, quantity, and quality of data needed to reach defensible decisions from the RI, to assess appropriate remedial technologies, and develop and evaluate remedial action alternatives in the FS.

The following anticipated RI field activities will be conducted.

- Mark investigation area boundaries and establish survey controls.
- Perform vegetation removal in limited areas where brush creates an impassable barrier for digital geophysical mapping (DGM) transects.
- Bury and survey blind QC seeds.
- Conduct instrument verification strip (IVS) analysis for EM61-MK2 DGM system validation.
- Perform geophysical transect investigation (with anomaly avoidance) along 3-foot wide transects across the AOI and as depicted on **Figure 2-1**. This plan will achieve 6% coverage within the 285-acre former OB/OD area, 3% coverage in the proposed 1,362-acre 100-foot transect investigation zone, and 1.5% coverage in the outer 3,262-acre 200-foot investigation zone, as supported by probabilistic modeling using Visual Sample Plan (VSP).
- Process and analyze DGM data.
- Produce anomaly density map using the geostatistical density mapping tools in VSP to model the extent of geophysical anomalies.
- Reacquire and investigate selected DGM anomaly locations to determine nature of anomaly sources.
- Conduct analog geophysical survey and investigate detected anomalies to determine the nature of anomaly sources in portions of the AOI where terrain precludes the safe acquisition of DGM.
- Manage and dispose of recovered material documented as safe (MDAS) and material documented as an explosive hazard (MDEH).
- Collect MC samples with locations biased toward anomaly investigations.

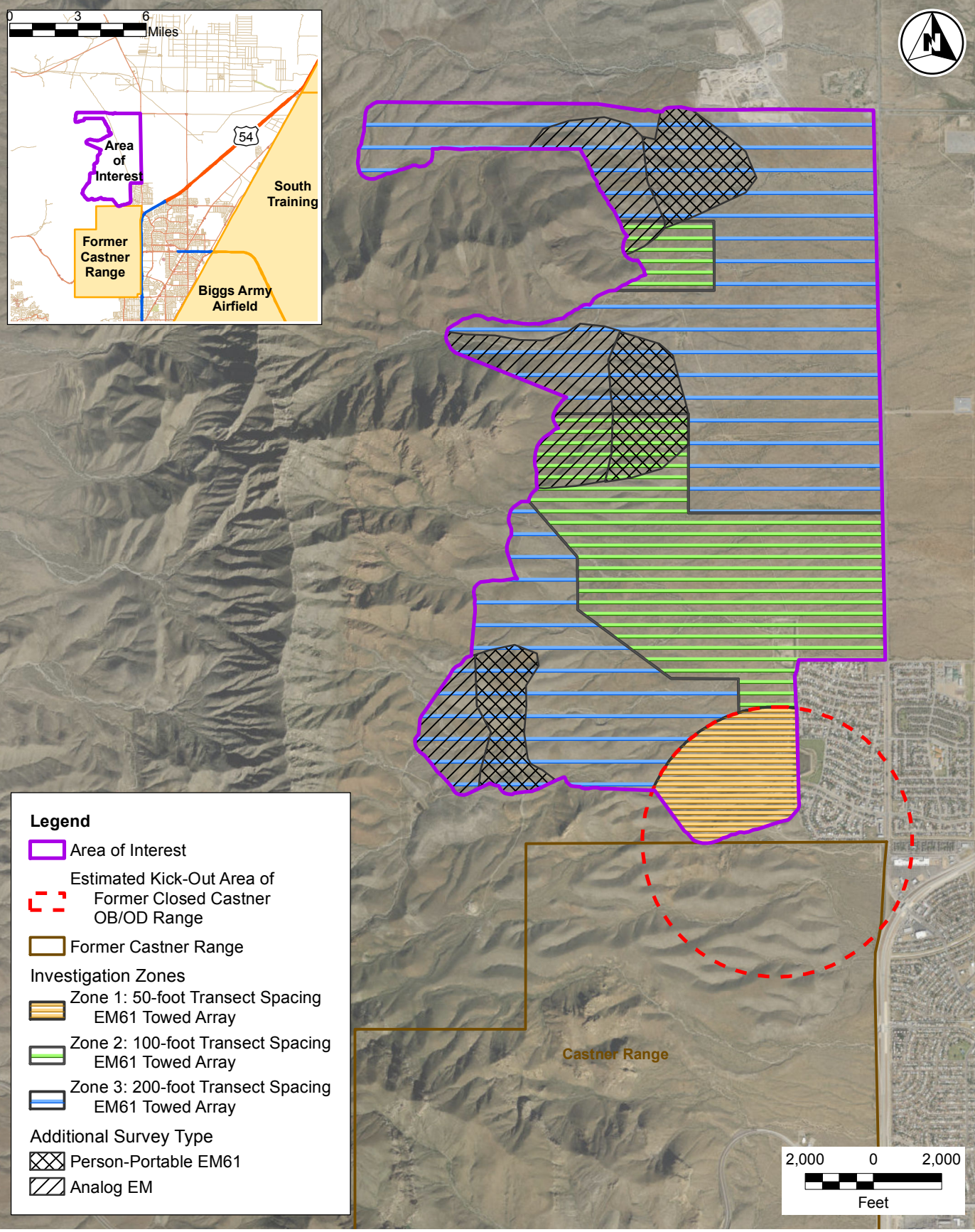
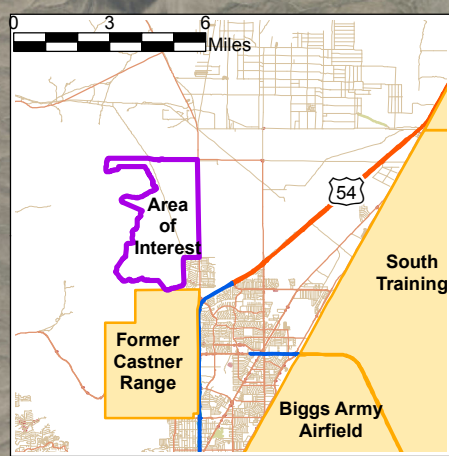
### 2.3.1. Field Kick-Off Meeting

Before beginning RI activities, KEMRON will conduct a field kick-off meeting involving all field personnel and project management. This meeting will be conducted on site and will be administered by our Field Manager with support from the Senior UXO Supervisor (SUXOS), site UXO Safety Officer (UXOSO)/UXO Quality Control Specialist (UXOQCS).

During the field kick-off meeting, the following topics will be discussed.

- *Site Operations* – the field team will discuss planned operations, equipment to be used, schedule, and requirements. The goal of this discussion is to confirm that all field personnel understand the project goals and planned schedule of events.
- *Site Safety* – the goal of this portion of the kick-off meeting is to ensure all field personnel understand and recognize the site risks, mitigation strategies, and planned response actions in case of an emergency. Emergency contact information and hospital routes will be issued to each field team as well as specific instructions for response actions.
- *UXO Recognition and Response* – during this portion of the field kick-off meeting, the project team will discuss items that could potentially be found in the area and the item-specific hazards. The purpose of this discussion is to familiarize the field staff with the items in various states and the proper response action to be implemented should they be encountered.

The meeting will be documented using a Site Meeting log and sign-in sheet as well as a Preparatory QC Inspection form. Documentation from this meeting will be recorded and placed in the project files.



### Legend

Area of Interest

Estimated Kick-Out Area of Former Closed Castner OB/OD Range

Former Castner Range

### Investigation Zones

Zone 1: 50-foot Transect Spacing EM61 Towed Array

Zone 2: 100-foot Transect Spacing EM61 Towed Array

Zone 3: 200-foot Transect Spacing EM61 Towed Array

### Additional Survey Type

Person-Portable EM61

Analog EM



**Area of Interest North of Castner Range**  
USACE - Tulsa District  
Fort Bliss, Texas

**Figure 2-1**  
Proposed Remedial  
Investigation Transects  
Project Management Plan

### 2.3.2. Mobilization/Demobilization

KEMRON field staff and subcontractors will begin mobilization following receipt of the written NTP from USACE. KEMRON anticipates completing the entire RI field effort in a single mobilization to make the best use of personnel and subcontractors. Prior to mobilization, the following activities will be completed.

- KEMRON personnel will receive training pertaining to ordnance known to be on site and associated safety precautions. This training will be conducted by the SUXOS and UXOSO/UXOQCS.
- Personnel will receive training on the specific equipment they will operate while on site.
- All site personnel will receive training on the APP, SSHP, and the Activity Hazard Analysis for tasks in which they will be involved.

KEMRON will mobilize in stages. The first stage will consist of the field management team (SUXOS, UXOSO/UXOQCS, and Field Manager), and UXO Technicians I, II III mobilizing to the site location and preparing the site for operations. Preparations will consist of identifying locations for demolition operations, field office location, and MPPEH/MD sort area. The field management team will also be responsible for procuring storage containers, establishing contact with Fort Bliss Range Control and vendors/ subcontractors, and securing equipment for field operations.

When the field management team has the site ready for commencement of the field program, the second stage of the mobilization process will be implemented. In this phase, the geophysical teams will mobilize to perform the geophysical survey. These teams will be responsible for site data acquisition and data transfer, as well as identifying any items of interest on the surface during transect surveys.

Additional UXO personnel will also mobilize during this stage. These UXO personnel will break out into teams to begin analog DGM surveys. Upon completion of the analog DGM surveys, the UXO teams will begin reacquisition and investigation of anomalies identified during the geophysical investigation.

Demobilization will consist of the geophysical team demobing upon completion of the geophysical surveys, followed by the UXO team after intrusive investigations and soil sampling activities have been completed. The field management team will remain on site to complete MPPEH/MD segregation and turn-in. The field management team will demobilize after completion of all turn-in and demolition activities.

### 2.3.3. Location Surveys and Mapping

KEMRON will use a state of Texas registered Professional Land Surveyor (PLS) to delineate the extent of the 4,909-acre AOI where needed to conduct RI field activities. Land survey activities will be conducted in accordance with all AEC and USACE guidance. The land survey teams will be escorted at all times by UXO technicians for anomaly avoidance. Field teams will use handheld global positioning system (GPS) units and existing features to identify and reference boundary lines as well as to mark/identify features of interest and areas of inaccessibility. This will minimize the boundary surveys that will be required. The PLS will also survey the locations of blind seed items.

The PLS will research, recover, and confirm the existing horizontal and vertical control networks within or near the AOI, including at least three recoverable control points for RI field team use. If necessary, control points will be established to provide GPS base station locations with sufficient coverage of the AOI. The PLS will provide a description of the monuments used for the survey and the data and recover sheets for existing and new control points, including coordinate values and recovery descriptions.

A land survey report will be prepared by the PLS, including a narrative of all work performed with locations provided in the UTM coordinate system with horizontal and vertical datum specified by the client. The survey report will describe the equipment and methodology used to perform the work and detail the results of the survey and the accuracies obtained. The survey report will contain the coordinate information of all locations surveyed and will be stamped, dated, and signed by the PLS with certification that the work was completed in compliance with the specification.

To avoid an additional mobilization, the PLS will complete the boundary survey required for fencing placement while in the field for the overall boundary survey.

#### 2.3.4. Geophysical Survey

The following section presents KEMRON's planned geophysical survey approach to meet the RI/FS objectives. Specific data needs will be discussed with project stakeholders during the TPP meetings, and geophysical survey approach described below will be modified and refined as necessary. Details of the final geophysical survey approach, including DQOs, will be presented in the UFP-QAPP.

KEMRON will use VSP, a proven statistical sampling tool for the RI investigation. VSP is a software tool developed for the DoD by Pacific Northwest Laboratory to support confident decision making through the design and evaluation of defensible sampling plans based on statistical sampling theory and the statistical analysis of sample results. Our munitions response and environmental staff provides trained expertise in the use of VSP, including an understanding of the statistical evaluation methods and the importance of realistic input values to its successful implementation. We have used VSP to design and evaluate successful investigation approaches for other RIs and MMRP projects. Use of VSP contributes to the development of the most cost-effective investigation approach and provides a statistically based sampling plan that is transparent and defensible.

No records exist of military use within the AOI North of Castner Range, and it is assumed that previous MD items recovered in the AOI are a result of training activities in the Fort Bliss Closed Castner Range, either as kick-out debris from the OB/OD area or from overshoot during training exercises at nearby ranges. Potential target area sizes in the AOI North of Castner Range are, therefore, unknown. As shown on **Figure 2-1**, KEMRON proposes to divide the AOI into three distinct transect sampling zones based on the understanding of the CSM and the likely distribution of MEC and related subsurface geophysical anomalies. **Table 2-1** provides a summary of the geophysical transect quantities planned for each investigation zone within the AOI. The transect design may be modified based on TPP meeting input.

**Table 2-1**  
**Area Coverage**

Transect Spacing	Total Area (acres)	Transect Area (acres)	Coverage
50-ft.	285.0	17.1	6%
100-ft.	1,362.0	40.8	3%
200 ft.	3,262.0	48.9	1.5%
Total	4,909.0	106.8	2%

An additional 10 acres of DGM transects beyond those shown on **Figure 2-1** are reserved to refine the nature and extent of MEC/MD in areas determined by the initial survey. KEMRON will use VSP to determine the location and spacing to further investigate areas of elevated anomaly density identified from the initial geophysical transect surveys. The additional geophysical surveys will provide higher-

resolution data in the areas where the greatest concentrations of subsurface anomalies may indicate an increased likelihood of the presence of subsurface MEC items.

### ***Data Processing, Interpretation, and Anomaly Selection***

MEC-experienced data processing geophysicists will use the Geosoft Oasis Montaj software for identifying and selecting geophysical anomalies for subsurface investigation. The following criteria, supplemented by site-specific target of interest information, will be applied to target selection.

- Maximum response amplitude with respect to local background conditions
- Shape of the response peak
- EM signal decay characteristics
- Location of the anomaly with respect to terrain features, cultural features, or utilities within or near the transect.

Geophysical anomalies for intrusive investigation will initially be selected using the automated target selection functions in the Geosoft UX-Detect module. Each identified target anomaly will then be analyzed by the MEC-experienced data processing geophysicist to evaluate its validity and position. Invalid or incorrectly located target anomalies will be removed or adjusted. The processed data will also be reviewed for potential target anomalies that were not identified by the UX-Detect target selection routine. These targets will be manually added to the investigation list. The intrusive investigation target list will be prepared, verified, and delivered for investigation within 2 days of data processing. Target anomalies identified from the DGM survey will be reacquired and intrusively investigated.

Based on the results of the previous study conducted by USACE and the fact that no records exist of military use of the AOI, it is anticipated that subsurface anomaly densities will be low throughout the AOI. If, however, the target anomaly population identified during data processing and analysis is larger than anticipated, a statistically representative sample of anomalies potentially representing munitions items will be selected for intrusive investigation using the Estimating a Proportion statistical method at a confidence level agreed upon by the project delivery team and the USACE. Subsequent excavation of selected anomalies will be used to characterize the nature of MEC items present in the AOI, delineate the spatial distribution and density of the MEC, and identify any associated MC contamination. Anomaly density maps will be produced using the VSP geostatistical density mapping tools to model and characterize the extent of subsurface metallic contamination.

These anomaly density maps will also aid in the real-time determination of MC sampling locations.

### ***Reacquisition***

KEMRON survey personnel, accompanied by a UXO Technician for anomaly avoidance, will reacquire the anomalies selected for intrusive investigation using RTK-GPS and an EM61-MK2. Anomaly locations will be marked with survey paint at the refined target location and a PVC survey flag will be placed near the target location. The PVC survey flag will be marked with the unique anomaly identification in indelible ink.

#### **2.3.5. MEC Characterization/Identification/Disposal**

### ***Intrusive Investigation***

Intrusive investigation teams will investigate the reacquired anomalies and digitally record the results of each investigation in GPS-enabled handheld tablet devices. These GPS instruments are capable of sub-meter accuracy or better with data post processing. By using tablets with this level of accuracy, the

project team is able to more accurately determine the location of anomalies in relation to the planned transects. The data acquisition software used is off-the-shelf and allows the use of forced data entry through pull-down menus, which adds to the quality of the recorded data by minimizing the potential errors inherently associated with manual data entry. Anomalies identified during analog transect surveys will be investigated at the time of their discovery, and the results of each investigation will be digitally recorded in the GPS-enabled handheld tablet devices.

All target information and GIS layer data will be entered and downloaded by the Field Manager, creating a single source of data input and export. The intrusive investigation teams will use handheld EM detectors to assist the dig team in locating the anomaly source. Each of the two intrusive investigation teams will consist of UXO Technicians I, II and III.

### ***MEC Disposal and Accountability***

KEMRON understands that the disposal of MDAS/MDEH is our responsibility. KEMRON will conduct all demilitarization, verification, and manifesting associated with MDAS/MDEH disposal. Disposal of MDEH items will take place as one of two event types—BIP or consolidated explosive demolition. In both cases, such operations will take place at the end of each day of discovery, or at less frequent intervals as dictated by need. This approach will minimize down time for the UXO teams and allow proper coordination with local response agencies and notification of local residents as required.

Due to the nature of the work environment, which includes privately owned properties, the security of recovered MEC items will be required if the items will be left in place overnight. In the event that demolition and disposal activities in the work area outside that which would affect the residential neighborhood cannot be completed before the end of the work day, guards will be posted and the items will be left in their field locations until the demolition operation takes place. KEMRON will employ a local security firm to perform this task. A safety briefing will be performed at each change of guard shift.

In the event that demolition and disposal activities are required within proximity to the adjacent residential community, evacuations may be required. Details of the evacuation notifications and procedures will be provided in the CRP. However, it is expected that notifications in the form of the emails and text messages as well as door hangers would occur for affected residents 24 hours before demolition activities. The item will be guarded as discussed above. Immediately before demolition activities, KEMRON personnel will verify that the area is clear except for essential personnel and will post guards at strategic areas to prevent ingress until said activities are complete. Residents will be provided with a pet-friendly rallying point and will be notified again once it is safe to return to their homes.

### ***Explosives Acquisition***

For this RI, KEMRON will use an “on-demand” explosives handling system. By using on-call explosives delivery, the project team eliminates setting up, siting, inspecting, and inventorying a temporary explosive storage area. Temporary explosives storage facilities require inspections by the Department of Alcohol, Tobacco, and Firearms that can delay start dates. Using on call delivery of explosives eliminates the potential for schedule delay related to these inspections.

### ***MEC Accountability***

KEMRON will prepare and maintain a detailed accounting of all MEC items/components encountered during RI activities. A Daily Operations Log will include information pertaining to the following:

- Date and time operations began;

- Date and time operations were completed;
- Amounts, nomenclature, and condition of MEC (i.e., UXO, MPPEH, or MEC);
- Location and depth of MEC; and
- Disposition method of MEC item.

An Explosive Accountability Log will account for all demolitions materials used to destroy MEC on site. Digital photography will also be incorporated to aid in MEC accountability and the identification of MEC recovered during the investigation activities and to track explosive accountability and MEC destruction.

### ***Munitions Debris and Range-Related Debris (MDAS)***

KEMRON will remove or relocate MDAS and range-related debris from the RI area of investigation (as required in the PWS), and will be responsible for the off-site disposal of MDAS and range-related debris. With respect to inspection, certification, and disposition procedures, KEMRON will follow the guidance found in IGD 14-10 and EM 200-1-15.

### ***Backfilling Excavations***

During each excavation, KEMRON will disturb the smallest intrusive footprint possible to support the removal of the anomaly source. Each dig will consist of KEMRON removing a “plug” of the top surface of the dig location. This plug will be set aside and used to cap the dig location after the dig to return the excavation location as close to its original state as possible. Excavation holes for each investigated anomaly will be backfilled upon completion of QC inspection. Excavated soil and vegetation will be returned to the location from which it was removed. For demolition locations, KEMRON will collect a post demolition soil sample prior to backfill.

#### **2.3.6. Munitions Constituents Sampling**

Soil samples will be collected to provide defensible analytical data of sufficient quality to determine whether environmental contamination from residual explosives and associated constituents (e.g., metals) has occurred. Only soil samples will be collected, as evaluation of surface water, sediment, and groundwater indicates that site conditions would preclude MC impacts to these media. Review of available maps and aerial photographs did not reveal the presence of surface water and the depth to groundwater and low precipitation rates in the region would not favor the migration of MC to groundwater.

KEMRON’s proposed plan is to use a combination of incremental sampling (IS) and biased composite sampling to collect representative soil samples from areas to determine if MC contamination is present and, if so, the nature and extent of any MC released to soil. Any deviations from the accepted planning documents will be recorded on daily quality control reports. Those that affect the DQOs will be reported to the USACE COR immediately.

Sampling will be accomplished with a 2-person sampling team consisting of one environmental scientist experienced with composite and IS methodologies and one UXO Technician II escort/sample technician.

### ***Incremental Sampling***

The intent of the IS method is to assess MC in soil by collecting multiple soil increments that are distributed relatively evenly throughout designated decision units (DU), which represent subdivisions of the AOI selected for incremental sampling. This technique enhances sample representativeness and minimizes sampling errors. The IS method will be employed in accordance with the *Interim Guidance 09-02 Implementation of Incremental Sampling (IS) of Soil for the Military Munitions Response Program*

(USACE, 2009) and EPA Method 8330B. The MC evaluation will be conducted in accordance with EPA Risk Assessment Guidance for Superfund (RAGS) series, EM 200-1-4 Volumes I and II (USACE, 1999 and USACE, 2010), and DID WERS-009.01.

KEMRON will work with stakeholders during the TPP process to refine the specific details of the sampling program, such as the DU sizes and locations and the list of analytes. These details will then be included in the appropriate sections of the UFP-QAPP.

### ***Fate and Transport of MC***

The fate and transport of contaminants are strongly influenced by physical, chemical, and speciation properties, as well as by environmental factors such as soil characteristics and overland surface water runoff. Each MC pathway includes a source, an exposure medium, an exposure route, and a receptor. MC migration pathways include air, water, soil, and the interfaces between the phases of the contaminant (i.e., solid, liquid, or gas). It is not expected that a groundwater pathway exist due to the depth of groundwater in the area.

The properties of explosives and metals are of primary interest at Fort Bliss during this investigation. Nitroaromatic explosives can be biotransformed, mineralized, or conjugated into higher molecular weight complex products. The primary processes influencing the fate of metals in soil include sorption, ion exchange, precipitation, and complexation with sorbed organic matter. Contaminant transport is also of interest due to the potential for contaminants to migrate away from the source area. A detailed discussion of MC fate and transport will be provided in the UFP-QAPP to help define the source-pathway-receptor relationships that will be used in the MEC hazard assessment and the human health and ecological risk assessments of the RI.

### ***Data Validation, Management, and Reporting***

Field sampling reproducibility is important for ensuring quality of sampling results. Field replicates provide a measure of the variability of the dataset and are key in demonstrating that data are defensible and representative. In accordance with USACE Interim Guidance 09-02 (USACE, 2009), sampling personnel will collect field duplicates at a rate of 10% and matrix spike/matrix spike duplicates at a rate of 5%. Replicate samples will be collected using procedures identical to those used for collecting the initial sample. It is important to emphasize that field replicates for IS are not field splits; rather they must be independently collected incremental samples from the same DU. Collecting IS from the DU using the triplicate method is recommended for the field replicate samples.

Analyses will be validated in accordance with DoD QSM version 5.1, the project-specific UFP-QAPP, and EPA method protocols/requirements. Laboratory staged electronic data deliverables (SEDD) will be provided to USACE in addition to hard copy and PDF versions of the data. Additionally, the analytical data will be uploaded to the Environmental Restoration Information System on a quarterly basis. KEMRON will comply with all applicable requirements for data validation and submission.

#### **2.3.7. Remedial Investigation Report**

Upon completion of RI field activities, KEMRON will prepare and submit an RI report addressing the AOI North of Castner Range. The RI report will include information on the nature and extent of contaminants, sampling means and methods, data validation, data quality and usability, fate and transport of MC, a MEC HA, risk evaluations, and revised MRSPP worksheets.

The following activities will be completed and incorporated into the RI report.

- Updated CSM: Upon completion of the RI, KEMRON will review the investigation results and update the preliminary CSM that was completed during project planning. The CSM will be refined to identify potential receptors for the risk assessment.
- Applicable or relevant and appropriate requirements (ARARs): KEMRON will develop preliminary ARARs during the RI in consultation with USACE. A standard/regulation will be designated as an ARAR only if it is: 1) promulgated; 2) substantive rather than administrative; and 3) a cleanup standard, control standard, or CERCLA requirement.
- MRSPP: Using the RI data related to the nature and extent of MEC and MC, KEMRON will prepare the MRSPP worksheets for the AOI North of Castner Range and include them in the RI Report. The MRSPP will determine the relative priority for response activities based on the overall conditions, taking into consideration various factors related to safety and environmental hazards.
- MEC Hazard Assessment: A MEC HA will be completed for the AOI North of Castner Range using the MEC HA guidance and accompanying scoring worksheets. The MEC HA will present a number of input factors to be scored based on both current (baseline) site conditions and expected site conditions following implementation of the proposed remedial alternatives. The worksheets will generate a score for the site based on a sum of the scores determined for each input factor, which will determine which of the four hazard levels (1 to 4) applies to the AOI under both baseline and post-remediation conditions.
- Human Health Risk Assessment (HHRA) and Baseline Ecological Risk Assessment (BERA): The risk assessment will include an initial screening of contaminant concentrations against EPA regional screening levels (RSLs) and ecological soil screening levels (SSLs). It is not expected that a focused or full HHRA and/or BERA will be required. However, if needed based on the screening results, the HHRA or BERA will be completed to address the potential for adverse human health or ecological effects associated with exposure to MC in soil in accordance with EPA Risk Assessment Guidance (EPA, 2016). The goal of the HHRA and BERA is to provide risk information to assist in the assessment of remedial action objectives for the site.

## **2.4. Achieve Feasibility Study**

The FS will develop remedial action alternatives based on the results of the RI that range from no additional action to subsurface clearance of the entire AOI (if action is required) in accordance with CERCLA guidance. The alternatives considered will also include institutional controls and surface clearance of the entire AOI as well as alternatives that focus surface clearance and subsurface clearance on portions of the AOI with high density of MD/MEC or have high public access. If MC contamination is encountered, the FS will develop and evaluate alternatives for removal/treatment of the impacted soil.

The FS will present the remedial action alternatives for the AOI North of Castner Range. The nine CERCLA evaluation criteria will be used in the detailed analysis of alternatives, with an emphasis on implementability, short-term and long-term effectiveness in protecting human health and the environment, and cost of each candidate alternative. Any distinct benefits to the Army of a given alternative within the framework of the non-owned and non-controlled status of the AOI North Castner Range will be identified, as will any special limitations that may be imposed by the lack of Army ownership and control.

## **2.5. Achieve Approved Proposed Plan**

The PP will be prepared to summarize the results of the FS and to present the preferred remedial alternative for stakeholder and public review and comment. A notice in English and Spanish requesting

public review and comment on the PP will be placed in the local El Paso newspapers to initiate the 30-day public comment period. During the comment period, a public meeting will be held to inform the local community of the proposed actions and to provide the public a forum for participation. A court reporter will prepare a meeting transcript, which will aid in preparing the Responsiveness Summary. KEMRON will work with the Army to resolve comments received from the public meeting, and will prepare and submit the final PP for approval.

## **2.6. Achieve Approved Decision Document**

Once the PP is approved, KEMRON will prepare the DD following *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA, 1999). The Responsiveness Summary compiled from comments received during the PP process will be included as an appendix to the DD. Upon request, KEMRON will support the Army Project Manager (PM) and COR through the chain of command to the appropriate approval authority (per EP 200-3-1).

## **2.7. Achieve Administrative Record**

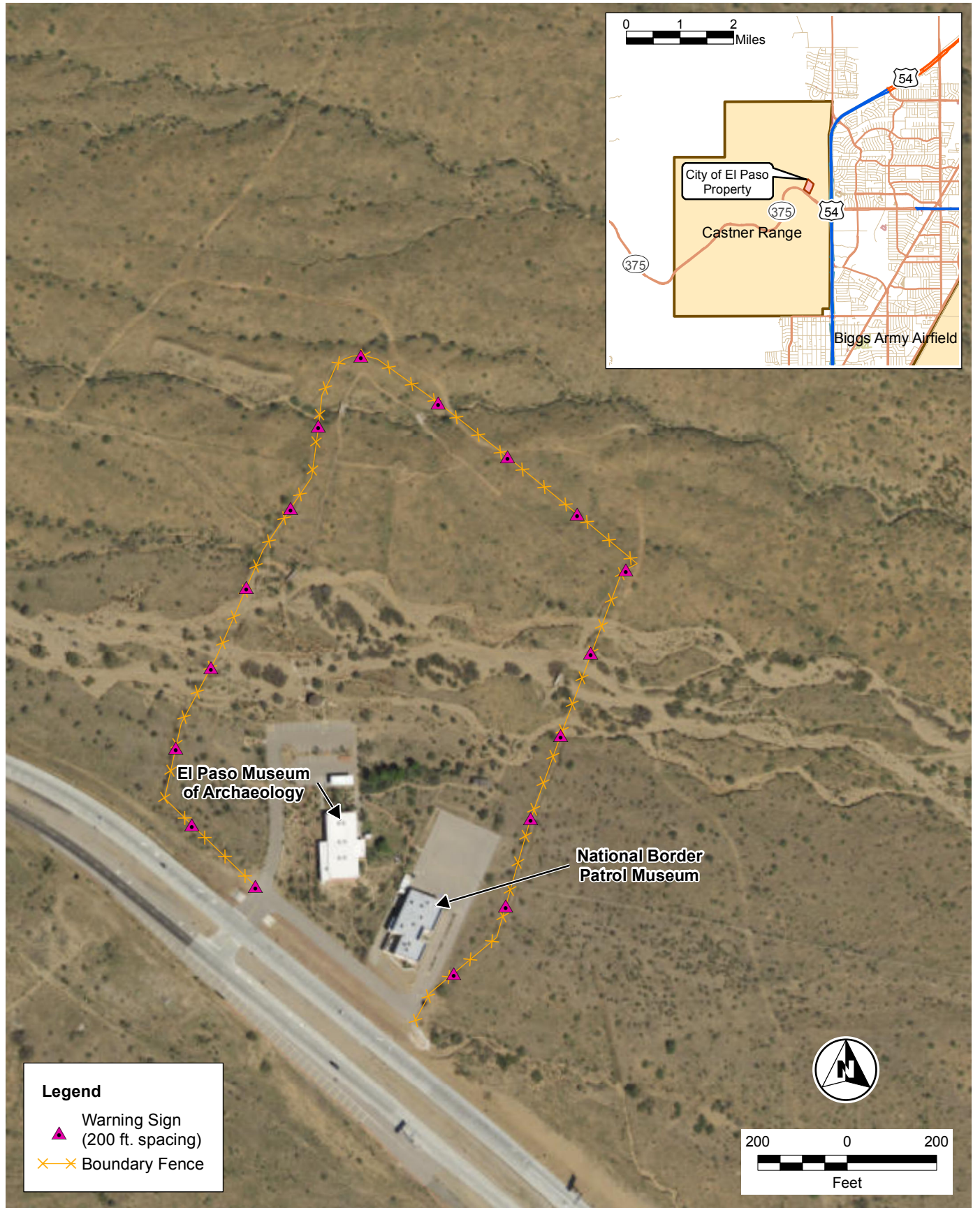
The reference in the PWS for the Contractor to "...establish and maintain the Administrative Record" indicates that no formal Administrative Record (AR) is currently in place for the project. KEMRON will, therefore, establish an AR for the RI/FS for AOI North of Castner Range project and update and maintain it throughout the life of the project in accordance with the guidance given in *Public Participation in the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS)* Chapter 4, Establishing and Maintaining Administrative Records (USACE, 2004). Mandatory documents to be included in the AR are identified in *Public Participation Requirements for Defense Environmental Restoration Program* (USACE, 2011). Other documents may be required, and KEMRON will coordinate with USACE to secure those documents. KEMRON will provide all final documents in the AR in duplicate on CD/DVD to USACE in a file form suitable for placement on the Project Information Retrieval System (PIRS) Website.

## **2.8. Achieve Fencing and Signage for Museum Area**

KEMRON will install approximately 3,400 feet of fencing, including signage, to support the required land use control measure for the closed landfill area containing the Archeology Museum and the Border Patrol Museum on the Closed Castner Range. The fence alignment will be established by the PLS with UXO technicians providing anomaly avoidance. Before installing the fence and concurrent with the geophysics boundary survey, KEMRON will conduct a boundary survey to ensure that the fence and signage are located entirely within Fort Bliss property. The installation will satisfy the following specifications as provided in the PWS.

- The fence will be of three-strand, 12.5-gauge, smooth wire.
- The fence will be installed with line posts on 100-foot centers and a corner post at each corner.
- Signs will be posted around the perimeter of the closed landfill at 200-foot intervals along the fence line.
  - Each pair of signs will be posted in English and Spanish using letters at least 2 inches in height, with KEMRON being responsible for confirming that the Spanish sign correctly reflects the information on the English sign.
  - The signs will be 3 feet by 2.5 feet in size and mounted on two 8-foot posts that will be secured with concrete at the base.
  - The signs will be constructed of a quality that will withstand the sun and mounted in such a way as to withstand the wind.

The PLS will survey the fence alignment following installation, with the survey data added to the survey plat to show the actual alignment. The survey plat and a letter report documenting the fence installation will then be provided to USACE and Fort Bliss. The approximate location of the fencing and signage is shown on **Figure 2-2**.



### **3. REMEDY REVIEW**

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While a remedy will be selected by the end of the period of performance, remedy implementation—if required—will be performed under separate contract. Therefore, a remedy review is not required under this contract.

## 4. PROJECT MANAGEMENT

Transparent and proactive communication between KEMRON, USACE, and other stakeholders is critical for the success of the RI/FS activity at AOI North of Castner Range. This section and **Figure 4-1** presents and identifies the key personnel involved with the performance of this project. KEMRON has teamed with Gilbane and has accepted responsibility for managing and completing the contracted tasks as described in **Table 4-1**.

### 4.1. Fort Bliss Team

**Table 4-1** presents the roles and responsibilities for the organizations involved with completing the work under TO DS01, which includes KEMRON, Gilbane, USACE, AEC, Fort Bliss, TCEQ, and EPA.

**Table 4-1**  
**Organizational Roles and Responsibilities**

Organization	Roles and Responsibilities
United States Army Corps of Engineers – Tulsa District (USACE)	<ul style="list-style-type: none"> <li>• Contract compliance</li> <li>• Contract administration</li> <li>• Overseeing/monitoring the contractor’s performance</li> <li>• Primary installation POC</li> <li>• Primary regulatory interface</li> <li>• Review technical documents and products</li> <li>• Review of contract documentation such as invoices, monthly status reports, and UFP-QAPP</li> </ul>
KEMRON	<ul style="list-style-type: none"> <li>• Program/project management</li> <li>• Project budget/schedule compliance</li> <li>• Manage cost accounting</li> <li>• Quality control lead</li> <li>• Health and safety lead</li> <li>• Subcontractor management</li> <li>• Document review and approval prior to Army submittal</li> </ul>
Gilbane	<ul style="list-style-type: none"> <li>• Technical task management</li> <li>• Develop UFP-QAPP and schedules</li> <li>• GIS/Administrative Record</li> <li>• Geophysics lead and investigation</li> <li>• Field management</li> <li>• Provide project reporting and updates</li> <li>• Report preparation</li> </ul>
Army Environmental Command (AEC)	<ul style="list-style-type: none"> <li>• Review technical documents and products</li> <li>• Review of contract documentation such as invoices, monthly status reports, and UFP-QAPP</li> </ul>
Fort Bliss	<ul style="list-style-type: none"> <li>• Review technical documents and products</li> <li>• Review of contract documentation such as invoices, monthly status reports, and UFP-QAPP</li> <li>• Coordination of site access issues</li> </ul>

**Table 4-1**  
**Organizational Roles and Responsibilities (cont.)**

Organization	Roles and Responsibilities
Texas Commission on Environmental Quality (TCEQ)	<ul style="list-style-type: none"> <li>• Regulatory oversight</li> <li>• Review technical documents and products</li> </ul>
U.S. Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> <li>• Regulatory oversight</li> <li>• Review technical documents and products</li> </ul>

Contact information for the individuals involved from each of the Fort Bliss project team organizations is provided in **Table 4-2**.

**Table 4-2**  
**Project Contact Information**

Title	Contact Information
USACE Contracting Specialist	<p>(b) (6)</p> <p>Tulsa District Corps of Engineers CESWT-CT 1645 S 101 E Ave Tulsa, OK 74128-4609 Phone: (b) (6)</p> <p>(b) (6)</p>
USACE Contracting Officer (KO)	<p>(b) (6)</p> <p>Tulsa District Corps of Engineers CESWT-CT 1645 S 101 E Ave Tulsa, OK 74128-4609 Phone: (b) (6)</p> <p>(b) (6)</p>
USACE Project Manager – Contracting Officer’s Representative (COR)	<p>(b) (6)</p> <p>Fort Worth District Corps of Engineers MIE Branch 1645 S 101 E Ave Tulsa, OK 74128-4609 Phone: (b) (6)</p> <p>(b) (6)</p>
USACE Technical Manager	<p>(b) (6)</p> <p>Fort Worth District Corps of Engineers MIE Branch 1645 S 101 E Ave Tulsa, OK 74128-4609 Phone: (b) (6)</p> <p>(b) (6)</p>

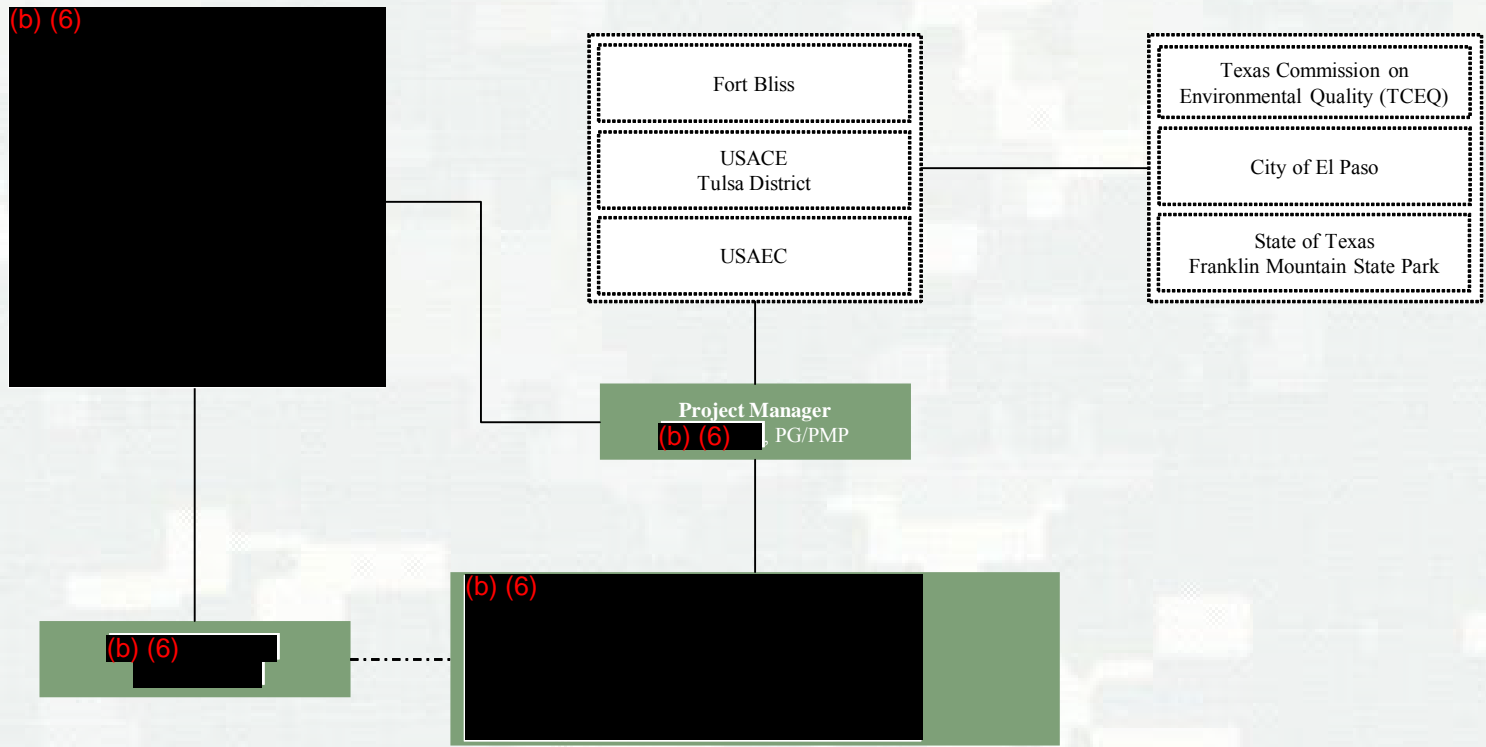
**Table 4-2**  
**Project Contact Information (cont.)**

Title	Contact Information
USACE Ordnance and Explosive Safety Specialist	(b) (6) Regional Planning and Environmental Center Fort Worth District 819 Taylor Street Ft. Worth, TX 76102 Phone: (b) (6) (b) (6)
USACE Geophysicist	(b) (6) Regional Planning and Environmental Center Fort Worth District 819 Taylor Street Fort Worth, Texas 76102 Phone: (b) (6) (b) (6)
Army Environmental Command (AEC) Environmental Restoration Manager	(b) (6) US Army Environmental Command-Midwest Division Environmental Service Support Manager 2450 Connell Rd, Bldg 2264 Fort Sam Houston, TX 78234-2686 Phone: (b) (6) Cell: 2(b) (6) (b) (6)
Fort Bliss Installation Environmental Contact	(b) (6) Directorate of Public Works Environmental Division ATTN: IMWE-BLS-PWE Bldg 622, Taylor Road Fort Bliss, TX 79916 Phone: (b) (6) (b) (6)
TCEQ Representative	(b) (6) P.O. Box 13087 MC 127 Austin, TX 78711-3087 Phone: (b) (6) (b) (6)
TCEQ Representative	(b) (6) P.O. Box 13087 MC 127 Austin, TX 78711-3087 Phone: (b) (6) 3 (b) (6)
TCEQ Section Manager	(b) (6) 401 East Franklin Ave., Suite 560 El Paso, TX 79901 (b) (6) (b) (6)

**Table 4-2**  
**Project Contact Information (cont.)**

Title	Contact Information
KEMRON Project Manager	(b) (6) PG, PMP 1359-A Ellsworth Industrial Blvd. Atlanta, GA 30318 Phone: Mobile: 
KEMRON WERS Program Manager	1359-A Ellsworth Industrial Blvd. Atlanta, GA 30318 Phone: Mobile: E-mail: <a href="mailto:rbrooks@kemron.com">rbrooks@kemron.com</a>
Gilbane Fort Bliss Task Manager for RI/FS and Related Reports	, PG, PMP 800 Oak Ridge Turnpike, Suite A-700 Oak Ridge, TN 37830 Phone: Mobile : E- <a href="#">.com</a>
Gilbane WERS Program Manager	, PE, PMP 304 Inverness Way South, Suite 200 Englewood, CO 80112 Phone: Mobile: 
Gilbane Technical Lead for MEC Recovery	800 Oak Ridge Turnpike, Suite A-700 Oak Ridge, TN 37830 Mobile : 
Gilbane Field Manager	304 Inverness Way South, Suite 200 Englewood, CO 80112 Phone: Mobile: 
Gilbane Geophysical Technical Lead	, PG 304 Inverness Way South, Suite 200 Englewood, CO 80112 Phone: Mobile: 

# Project Team



CIH Certified Industrial Hygienist  
CSP Certified Safety Professional  
SUXOS Senior Unexploded Ordnance Supervisor  
QC Quality Control  
USACE United States Army Corps of Engineers  
USAEC United States Army Environmental Command  
UXOQCS Unexploded Ordnance Quality Control Specialist  
UXOSO Unexploded Ordnance Safety Officer

— Direct Reporting  
--- Operational Reporting

Program Level

Project Level



Area of Interest North of Castner Range  
USACE - Tulsa District  
Fort Bliss, Texas

**Figure 4-1**  
Organization Chart  
Project Management Plan

## 4.2. Project Team Responsibilities

Clear lines of communication and direct responsibility for task performances are keys to successful management of this project. KEMRON's PM, Dan Burnett, will serve as the single direct POC with the USACE KO to ensure well-defined contracting direction. In addition, he will serve as POC for USACE and Fort Bliss staff and be responsible for all related activities under this TO.

Primary roles and responsibilities for these key individuals are presented in **Table 4-3**.

**Table 4-3**  
**Key Management Responsibilities and Authorities**

Position	Responsibilities	Authorities
Program Manager-KEMRON [REDACTED]	Overall program leadership/direction Overall program health and safety Overall program quality assurance/control Primary contractual POC Project management/regulatory support	Modify contractual assignments/changes Approve program policies Allocate company resources Approve project deliverables Stop unsafe and non-compliant work
Project Manager-KEMRON [REDACTED], PG, PMP	Project leadership/direction Project health and safety Project quality assurance/control Primary installation POC Primary regulatory interface Subcontractor selection/management Project budget/schedule compliance Develop UFP-QAPP, budgets, and schedules Manage cost accounting Provide project reporting and updates	Modify assignments within scope/budget/schedule Review project deliverables Approve project expenditures Approve project assignments Negotiate subcontracts Stop unsafe and non-compliant work
Task Manager-Gilbane [REDACTED], PG, PMP	Primary point of contact for technical project requirements Responsible for the overall management of the technical quality of the contract Direct the development and implementation of the QA/QC Program Ensure the Health and Safety Program is adequately implemented	Review/author project deliverables Approve project field assignments Stop unsafe and non-compliant work
Field Manager-Gilbane [REDACTED]	Primary point of contact for field activities Community Relations Specialist	Conduct historical records search Modify field assignments within scope/schedule Author project deliverables Overseeing/guiding subcontractors Stop unsafe and non-compliant work

**Table 4-3**  
**Key Management Responsibilities and Authorities (cont.)**

<b>Position</b>	<b>Responsibilities</b>	<b>Authorities</b>
Geophysics Technical Lead- Gilbane (b) (6), PG	Primary point of contact for geophysical investigation	Technical coordination of geophysical requirements Prepare geophysical plan Collect geophysical data Stop unsafe and non-compliant work
MEC Recovery Technical Lead-Gilbane [REDACTED]	Primary point of contact for UXO-related issues	Review UFP-QAPP Overseeing/guiding technicians and subcontractors Stop unsafe and non-compliant work
SUXOS-KEMRON [REDACTED]	Directly control the operations of field personnel performing MEC activities Helps field personnel achieve maximum operational safety and efficiency Implements the approved plans in the field Reviews and approve any changes to the UXO plans	Final authority in decisions regarding all MEC issues, performance of disposal activities and site management. Oversight and direction of the field team Interfacing with all field team personnel and the client during the daily field operations Stop unsafe and non-compliant work
UXOQC/UXOSO-KEMRON [REDACTED]	UXO quality control Oversee implementation of Health and Safety Program	Identify and characterize UXO/MEC Conduct QA audits Conduct safety audits

### **4.3. Subcontractor Management**

Selecting the proper, fully qualified subcontractor is essential to maintaining low risk in cost, schedule, and quality performance while streamlining overall project management. KEMRON carefully selected Gilbane based on our previous successful working relationship and their exceptional current and past performance on similar projects, including a very similar project at Fort Bliss.

To ensure success in effectively managing subcontractors on a performance-based contract, KEMRON will use firm fixed price/firm unit price subcontracts, and our PM will continuously and aggressively coordinate and manage the cost, schedule, safety, and quality aspects of subcontractor performance. In the case of Gilbane and as a result of our past joint experience, KEMRON will pass full performance responsibility on to Gilbane for their assigned work activities to share the overall performance risk on the project. Should unexpected performance issues arise, KEMRON maintains staff and infrastructure to self-perform the work currently planned for Gilbane and stands ready to substitute our forces.

Other types of services that may require subcontractor involvement include brush clearing, land surveying, and ordnance scrap and investigation-derived waste disposal.

Gilbane's Field Manager will provide direct oversight of subcontractor activities and all on-site activities will be scheduled and coordinated through her.

The Field Manager will review daily subcontractor reports that detail the work completed, labor type and hours applied, as well as equipment hours and materials used. KEMRON's PM oversees subcontractor budgets, schedules, and performance issues.

Each subcontractor has been (or will be) selected based on their understanding and response to KEMRON's detailed scope of work and a comprehensive evaluation of their approach, estimated cost, and past experience to perform the work required. A key element in subcontractor quality is ensuring clear understanding of each work activity. Each subcontractor will be held to the same quality and work standards as KEMRON. If quality issues are identified and corrective measures do not improve performance, KEMRON will remove the subcontractor involved and replace them.

The Field Manager will work closely with subcontractors to coordinate schedules and work procedures in compliance with project needs. Daily meetings will be held with each on-site subcontractor to outline work activities planned for that day and to discuss potential issues/concerns. The field leader will coordinate all field activities with Fort Bliss representatives and will ensure that there are no operational, schedule or safety conflicts.

### **4.4. Quality Control**

KEMRON's QA/QC Program is the framework to ensure that quality is integrated into all aspects of operations, management, and project execution. Our corporate QA/QC Program ensures that consistent policies are enforced throughout the organization as they relate to corporate, contract, and project-specific procedures. The QA/QC Program is simple and direct, and incorporates four basic elements: Procedures, Training, Auditing, and Corrective Actions.

KEMRON uses the following three-phase approach to project QC to ensure the quality of work in compliance with all the contract and regulatory requirements.

- **Preparatory Phase** – Includes planning leading up to actual start of work. Successful completion of the Preparatory Phase verifies that the project delivery, quality, and health and

safety plans have been completed, are ready to be implemented, and are understood by all members of the project team.

- **Initial Phase** – Occurs at the startup of the TO field work activities, and ensures that activities are being effectively implemented and the desired results are being achieved.
- **Follow-up Phase** – Primarily an auditing phase, which addresses that the routine day-to-day activities of the TO are being performed in compliance with all QA/QC requirements.

The UFP-QAPP (Contract Line Item Number [CLIN] 001D) will be geared specifically to contract specific on-site operations and testing designed to ensure that every step of the field work and data interpretation processes meet established quality requirements. The UFP-QAPP will address all levels of work at a sufficient level of detail to function as an audit guide for geophysics, MEC handling and deposition, field sampling and laboratory work. The UFP-QAPP will cover subcontracted activities, and its provisions will be followed by any subcontractors and suppliers participating in the project. The site-specific UFP-QAPP will ensure KEMRON, and in turn USACE, that the work complies with all regulatory and contractual requirements. It will be reviewed by USACE before work begins, and no site operations will begin without acceptance of the UFP-QAPP or written permission of the KO.

During the execution of this TO, the field team, under the direction of the Technical Leads and Field Manager, will complete the soil sampling, geophysical, and MEC retrieval work in strict accordance with the procedures prescribed in the UFP-QAPP.

KEMRON's UXOQCS/UXOSO will be present on site during field operations and has stop-work authority. Reporting directly to the Program QC Manager, our UXOQCS/UXOSO will review MEC/UXO components of the UFP-QAPP, ensure quality compliance by KEMRON and subcontractors, and work with the Field Manager and SUXOS to resolve any quality issues that may arise at the project level. He will conduct announced and unannounced inspections of both work in progress and completed work to ensure that all work is performed in compliance with the UFP-QAPP and the accompanying UFP-QAPP, and will approve corrective actions to ensure all work complies with contractual requirements. Any action that causes KEMRON to fail to meet established project DQOs will be considered as a non-conformance subject to corrective action.

KEMRON will enact a document review process that will be applied to all documents from this PMP to the DD. Each document will be prepared by a technical lead with the assistance of subject matter experts, as appropriate. The document will then progress through an iterative process in which all data, tables, figures, references, calculations, and citations are independently verified as accurate. The document then will go through a peer review in which the document is reviewed by a party with knowledge of the project and its goals and expectations, but who was not directly involved in the writing of the document. Next, the document will enter a technical editing step. Following PM review and approval, and before submitting to the client, all primary technical documents will be reviewed by an Independent Technical Reviewer for the purpose of ensuring that the project objectives have been met and that the conclusions are technically defensible. This reviewer is a senior staff member who is knowledgeable about the type of work performed, but is not a member of the project team. KEMRON and Gilbane have successfully applied this document review process to projects where the technical and management staff are from both companies.

#### 4.5. Safety

For KEMRON, safety is the number one priority from the office to the field. Therefore, KEMRON maintains strong and comprehensive corporate Health and Safety Program that includes a corporate Health and Safety Plan, and has achieved an excellent record of safe project performance. Our program meets all requirements in the *Safety and Health Requirements Manual* (USACE, 2014), *Explosives* -

*Safety and Health Requirements Manual* (USACE, 2013a), and Occupational Safety and Health Administration requirements of 29 CFR 1910 and 1926. KEMRON will prepare the APP and ESP in support of the UFP-QAPP based on our corporate experience and commitment to safety. Our focus on health and safety is demonstrated by our most recent Experience Modification Rate (EMR) of 0.83.

As prime contractor, KEMRON will maintain responsibility for overall site safety for the Fort Bliss TO. Operationally, all members of the project team are responsible for safety. Throughout execution of the project, the UXOQCS/UXOSO will strictly enforce safety procedures outlined in the APP and SSHP, hold daily tailgate safety meetings, and conduct announced and unannounced safety inspections to ensure compliance. It is our intention to draw upon the knowledge and experience that Gilbane can provide, and incorporate their successful safety policies on other MEC projects into the project safety plans and procedures. This will maximize the safety of all on-site employees and ensure minimal risk to Fort Bliss and USACE. To further maintain the safety of all, KEMRON empowers all workers with the ability to stop work for unsafe practices.

#### **4.6. Meetings**

The KEMRON team will meet with the USACE PM monthly (via teleconference or in person) to provide project status, updates, and to resolve any outstanding issues. KEMRON's PM, Field Manager, and others (as appropriate) will attend this meeting. KEMRON will also attend meetings as requested by USACE to provide technical support and/or project updates to regulatory agencies, involved community members, or other stakeholders. All meeting minutes will be documented and distributed to USACE, regulators, and KEMRON project management.

##### **4.6.1. Presentation of Projects**

KEMRON will make four progress presentations during the course of the work associated with the RI/FS for AOI North of Castner Range to update Fort Bliss, AEC, and USACE personnel. The first will present the results of the historical research and the planned field activities. The second will provide the results of the RI. The third and fourth progress presentations will be conducted during the FS preparation.

##### **4.6.2. Technical Project Planning Meetings**

The TPP process will be used as a method to identify and engage stakeholders, establish project end-state objectives, address concerns during the initial phases of project planning and throughout the RI/FS process, gain accelerated consensus on the investigation DQOs, develop and refine the CSM, and allow for developing a complete RI UFP-QAPP that is acceptable to all involved parties. KEMRON will increase the level of partnering with regulatory agencies to identify differences in the technical approaches and resolve early in the CERCLA process.

Three TPP meetings with project stakeholders will be convened at various stages of the project to develop and present results of project DQOs. The TPP meetings will be held in the El Paso area to better accommodate Fort Bliss and TCEQ personnel. The first TPP meeting will be held before submitting the draft final UFP-QAPP. The second TPP will be held before beginning field activities. The results of the investigation will be discussed during the third TPP meeting. The third TPP meeting will also require stakeholders to reach a consensus regarding the alternatives presented in the FS. KEMRON will electronically provide a short summary of the results of each meeting to relevant stakeholders within seven days for review and approval.

#### 4.6.3. Restoration Advisory Board Meetings

KEMRON will attend and, as appropriate, present at three RAB meetings in the El Paso area. To present the most recent and relevant project information, effort will be made to schedule the TPP meetings around the RAB meetings. The RAB meetings will address similar information as the TPP meetings. Presentation materials for the RAB meetings will be prepared in both English and Spanish, in coordination with the Fort Bliss PAO and USACE. It is expected that KEMRON will produce the meeting materials with review provided by USACE and the Fort Bliss PAO. KEMRON will submit these materials for review and comment 7 days before the RAB meeting.

#### 4.7. Document Preparation, Administrative Records and Data Management

Separate historical records, RI, FS, PP, and DD documents will be prepared for the current phase of work at Fort Bliss. The KEMRON team will prepare the documents, drawing on their past experience preparing USACE- and federal/state regulator-accepted reports.

Draft reports will be submitted to USACE for review and comment. Comments will be addressed in a formal Response to Comments and, upon acceptance, once those comments are incorporated, the document will be transmitted as a draft final to all stakeholders for review and then finalized upon resolution of comments. A review meeting will be scheduled in coordination with USACE to facilitate review and acceptance of the report.

Final reports will document all data compiled, presented, and interpreted to support important evaluations and the path forward for AOI North of Castner Range, Fort Bliss.

Submittals of draft, draft final, and final versions of KEMRON documents will follow the distribution plan presented in **Table 4-4**. KEMRON will help maintain the project repositories and the AR.

To facilitate project documentation, KEMRON will maintain an electronic database of project-specific documents, field notes, sample collection information, and analytical testing results. A Fort Bliss GIS database also will be developed and updated as validated site data are received.

**Table 4-4**  
**Document Distribution**

Distribution		Draft	Draft Final	Final
USACE KO Tulsa	(b) (6)	Hard Copies – 0	Hard Copies – 0	Hard Copies – 1
	Tulsa District Corps of Engineers CESWT-CT 1645 S 101 E Ave Tulsa, OK 74128-4609	Electronic – 1	Electronic – 1	Electronic – 1
USACE PM/COR Tulsa	(b) (6)	Hard Copies – 0	Hard Copies – 0	Hard Copies – 1
	Fort Worth District Corps of Engineers MIE Branch 1645 S 101 E Ave Tulsa, OK 74128-4609	Electronic – 1	Electronic – 1	Electronic – 1

**Table 4-4  
Document Distribution (cont.)**

<b>Distribution</b>		<b>Draft</b>	<b>Draft Final</b>	<b>Final</b>
USACE TM Tulsa	(b) (6) Fort Worth District Corps of Engineers MIE Branch 1645 S 101 E Ave Tulsa, OK 74128-4609	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1	Hard Copies – 1  Electronic – 1
USACE OESS	(b) (6) Regional Planning and Environmental Center Fort Worth District 819 Taylor Street Fort Worth, Texas 76102	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1	Hard Copies – 1  Electronic – 1
Fort Bliss	 Directorate of Public Works Environmental Division ATTN: IMWE-BLS-PWE Bldg 622, Taylor Road Fort Bliss, TX 79916	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1	Hard Copies – 1  Electronic – 1
AEC	 US Army Environmental Command- Midwest Division Environmental Service Support Manager 2450 Connell Rd, Bldg 2264 Fort Sam Houston, TX 78234-2686	Electronic – 1	Electronic – 1	Electronic – 1
TCEQ (Sent to Fort Bliss- Ron Baca, for distribution)	 P.O. Box 13087 MC 127 Austin, TX 78711-3087	Hard Copies – 0  Electronic – 0	Hard Copies – 1  Electronic – 1	Hard Copies – 1  Electronic – 1
TCEQ (Sent to Fort Bliss- Ron Baca, for distribution)	 P.O. Box 13087 MC 127 Austin, TX 78711-3087	Hard Copies – 0  Electronic – 0	Hard Copies – 1  Electronic – 1	Hard Copies – 1  Electronic – 1
TCEQ (Sent to Fort Bliss- Ron Baca, for distribution)	 401 East Franklin Ave., Suite 560 El Paso, TX 79901	Hard Copies – 0  Electronic – 0	Hard Copies – 1  Electronic – 1	Hard Copies – 1  Electronic – 1
KEMRON	 , PG, PMP 1359-A Ellsworth Industrial Blvd. Atlanta, GA 30318	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1
KEMRON	 1359-A Ellsworth Industrial Blvd. Atlanta, GA 30318	Hard Copies – 0  Electronic – 0	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1

**Table 4-4**  
**Document Distribution (cont.)**

Distribution		Draft	Draft Final	Final
Gilbane	██████████ 800 Oak Ridge Turnpike, Ste A-700 Oak Ridge, TN 37830	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1
Gilbane	(b) (6) ██████████ 304 Inverness Way South, Suite 200 Englewood, CO 80112	Hard Copies – 0  Electronic – 1	Hard Copies – 0  Electronic – 1	Hard Copies – 1  Electronic – 1

The KEMRON team will use a comprehensive electronic data management system (EDMS) to avoid input errors and to significantly reduce the effort necessary to manage and accurately report environmental data to USACE. The TO Project Chemist will apply the EDMS to ensure that DQOs are met and that the data is precise, reliable, reproducible, and defensible. EDMS allows the following.

- Receive the data electronically from the laboratory
- QC the data against project requirements in real time as it is uploaded
- Automate much of the data validation process
- Provide a fully searchable data repository
- Automate generation of tables and trend graphs
- Connect directly with GIS for figure generation
- Output appropriate files for uploading into government databases (Environmental Resources Program Information Management System [ERPIMS], Naval Installation Restoration Information Solution [NIRIS], etc.)
- Provide data access through a Web-based portal to share with the Army and regulators.

TO-specific data quality criteria will be entered into the EDMS consistent with the UFP-QAPP. Our analytical laboratories will then submit sample results electronically, and EDMS will automatically screen the uploaded data against the quality criteria and DQOs.

#### **4.8. Monthly Progress Report, Invoicing, and Schedule**

KEMRON will prepare a brief Monthly Progress Report summarizing progress to USACE by the 15th working day of the month following the reported period. Each Monthly Progress Report will include a discussion of work completed, an updated project schedule, and discussion of issues or deviations from original scope items or schedule. The report will also contain information necessary to describe problems or issues and how each issue will be addressed.

##### **4.8.1. Invoicing**

KEMRON will submit an invoice (typically monthly) that corresponds to activities documented in the Monthly Progress Report within 10 working days from the submittal of the Monthly Progress Report. The invoice will tie to the milestone payments listed in the Milestone Payment Schedule (**Attachment C**). If no milestone is completed during a Monthly Progress Report period then no invoice will be submitted.

As specified in the delivery order requirements, original invoices for payment will be sent to:

Department of the Army  
US Army Corps of Engineers Finance Center  
5722 Integrity Drive  
Millington TN 38064

Copies of the invoice for review and approval will also be sent to:

Tulsa District Corps of Engineers  
Attn: (b) (6) (CESWF-PEC-EE)  
1645 S 101 E Ave  
Tulsa, OK 74128-4609

[REDACTED]  
[REDACTED]

And

Tulsa District Corps of Engineers  
Attn: CESWF-PEC-EE ([REDACTED])  
1645 S 101 E Ave  
Tulsa, OK 74128-4609

[REDACTED]  
[REDACTED]

#### 4.8.2. Integrated Master Schedule

The baseline RI/FS for AOI North of Castner Range integrated master project schedule is located in **Attachment A** of this document. This schedule will undergo continuous updates as part of the Monthly Progress Report submittal process.

## **5. REFERENCES**

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- Ashworth, John B., 1990. *Evaluation of Ground-Water Resources in El Paso County, Texas*. Texas Water Development Board Report 324. March.
- U.S. Department of Defense (DoD), 2008. *Ammunition and Explosives Safety Standards: General Explosives Safety Information and Requirements*. 6055.09-M, volume 1. February.
- DoD, 2013. *Quality Systems Manual (QSM) for Environmental Laboratories*, version 5.0. July.
- Department of the Army, 2014a. *Range Safety*. Pamphlet 385-63. April.
- Department of the Army, 2014b. *Ammunition and Explosives Safety Standards*. Pamphlet 385-64. December.
- U.S. Environmental Protection Agency (EPA), 1999. *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. EPA 540-R-98-031. July.
- EPA, 2002. *Superfund Community Involvement Toolkit*. EPA 540-K-01-004. September.
- EPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA QA/G-4. February.
- EPA, 2016. Risk Assessment Guidance for Superfund (RAGS) Series.  
[www.epa.gov/risk/risk-assessment-guidance-superfund-rags-part](http://www.epa.gov/risk/risk-assessment-guidance-superfund-rags-part)
- U.S. Army, 2009. *Munitions Response Remedial Investigation/Feasibility Study Guidance*. November.
- U.S. Army, 2013. *The Army Safety Program*. Army Regulation 385-10. November.
- U.S. Army Corps of Engineers (USACE), 1999. *Risk Assessment Handbook Volume I: Human Health Evaluation*. EM 200-1-4. January.
- USACE, 2001. *Requirements for the Preparation of Sampling and Analysis Plans*. EM 200-1-3. February.
- USACE, 2004. *Public Participation in the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS)*. EP 1110-3-8. April.
- USACE, 2009. *Interim Guidance 09-02 Implementation of Incremental Sampling (IS) of Soil for the Military Munitions Response Program*. July.
- USACE, 2010. *Risk Assessment Handbook Volume II: Environmental Evaluation*. EM 200-1-4. December.
- USACE, 2011. *Public Participation Requirements for Defense Environmental Restoration Program*. Engineer Pamphlet (EP) 200-3-1. September.
- USACE, 2013a. *Explosives - Safety and Health Requirements Manual*. EM 385-1-97. May.

USACE, 2013b. *Demonstration of Incremental Sampling Methodology for Soil Containing Metallic Residues*. September.

USACE, 2014. *Safety and Health Requirements Manual*. EM 385-1-1. November.

USACE, 2015. *Technical Guidance for Military Munitions Response Actions*. EM 200015. October.

USACE, 2016. *Technical Project Planning Process*. EM 200-1-2. February.

**ATTACHMENT A**  
**BASELINE SCHEDULE**

Activity ID		Activity Name	Org Dur	Start	Finish	2017					2018				2019			
						Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Castner Range, Fort Bliss, TX			720	03-Nov-16	20-Sep-19													
A1010	Notice to Proceed		0	03-Nov-16		◆ Notice to Proceed												
001 - Achieve Planning Documents for AOI North of Castner Range			607	03-Nov-16	11-Apr-19													
001A - Project Kick-off Meeting			12	06-Dec-16	21-Dec-16													
A1011	Conduct Project Kick-off Meeting		2	06-Dec-16	07-Dec-16	I Conduct Project Kick-off Meeting												
A1012	Prepare Project Kick-off Meeting Minutes		10	08-Dec-16	21-Dec-16	█ Prepare Project Kick-off Meeting Minutes												
A1013	Submit Project Kick-off Meeting Minutes		0		21-Dec-16	◆ Submit Project Kick-off Meeting Minutes												
001B - Project Management Plan (PMP)			607	03-Nov-16	11-Apr-19													
Draft PMP			39	03-Nov-16	03-Jan-17													
A1015	Prepare Draft PMP		19	03-Nov-16	02-Dec-16	█ Prepare Draft PMP												
A1020	Army review of Draft PMP		20	05-Dec-16	03-Jan-17	█ Army review of Draft PMP												
A1040	Army COR approval of Draft PMP		0		03-Jan-17	◆ Army COR approval of Draft PMP												
Final PMP			50	04-Jan-17	16-Mar-17													
A1050	Prepare Final PMP		20	04-Jan-17	01-Feb-17	█ Prepare Final PMP												
A1060	Army, Regulator review of Final PMP		20	02-Feb-17	02-Mar-17	█ Army, Regulator review of Final PMP												
A1070	Response to Army, Regulator comments Final PMP		10	03-Mar-17	16-Mar-17	█ Response to Army, Regulator comments Final PMP												
A1080	Government approval of Final PMP		0		16-Mar-17	◆ Government approval of Final PMP												
Annual update of PMP			269	16-Mar-18	11-Apr-19													
A1090	Annual Update of PMP		10	16-Mar-18	29-Mar-18	█ Annual Update of PMP												
A1091	Submit Annual PMP Update		0		29-Mar-18	◆ Submit Annual PMP Update												
A1093	Annual Update of PMP		10	29-Mar-19	11-Apr-19													
A1094	Submit Annual PMP Update		0		11-Apr-19	█ Annual Update of PMP ◆ Submit Annual PMP Update												
001C - Quality Assurance Project Plan (QASP)			79	03-Nov-16	02-Mar-17													
Draft QASP			39	03-Nov-16	03-Jan-17													
A3180	Prepare Draft QASP		19	03-Nov-16	02-Dec-16	█ Prepare Draft QASP												
A3190	Army review of Draft QASP		20	05-Dec-16	03-Jan-17	█ Army review of Draft QASP												
A3200	Army COR approval of Draft QASP		0		03-Jan-17	◆ Army COR approval of Draft QASP												
Final QASP			40	04-Jan-17	02-Mar-17													
A3210	Prepare Final QASP		10	04-Jan-17	18-Jan-17	█ Prepare Final QASP												
A3220	Army, Regulator review of Final QASP		20	19-Jan-17	15-Feb-17	█ Army, Regulator review of Final QASP												
A3230	Response to Army, Regulator comments Final QASP		10	16-Feb-17	02-Mar-17	█ Response to Army, Regulator comments Final QASP												
A3240	Government approval of Final QASP		0		02-Mar-17	◆ Government approval of Final QASP												
001D - Work Plan and SSHP/APP			120	22-Nov-16	16-May-17													
Draft Work Plan and SSHP/APP			40	22-Nov-16	23-Jan-17													
A3330	Prepare Draft Work Plan (QAPP) and SSHP/APPP		20	22-Nov-16	21-Dec-16	█ Prepare Draft Work Plan (QAPP) and SSHP/APPP												
A3340	Army review of Draft Work Plan (QAPP) and SSHP/APPP		20	22-Dec-16	23-Jan-17	█ Army review of Draft Work Plan (QAPP) and SSHP/APPP												
A3350	Army COR approval of Draft Work Plan (QAPP) and SSHP/APPP		0		23-Jan-17	◆ Army COR approval of Draft Work Plan (QAPP) and SSHP/APPP												
Draft Final Work Plan and SSHP/APP			40	24-Jan-17	21-Mar-17													
A4830	Prepare Draft Final Work Plan (QAPP) and SSHP/APPP		10	24-Jan-17	06-Feb-17	█ Prepare Draft Final Work Plan (QAPP) and SSHP/APPP												
A4840	Army, Regulator review of Draft Final Work Plan (QAPP) and SSHP/APPP		20	07-Feb-17	07-Mar-17	█ Army, Regulator review of Draft Final Work Plan (QAPP) and SSHP/APPP												
A4850	Response to Army, Regulator comments Draft Final Work Plan (QAPP) and SSHP/AF		10	08-Mar-17	21-Mar-17	█ Response to Army, Regulator comments Draft Final Work Plan (QAPP) and SSHP/APPP												
A4860	Army COR approval of Draft Final Work Plan (QAPP) and SSHP/APPP		0		21-Mar-17	◆ Army COR approval of Draft Final Work Plan (QAPP) and SSHP/APPP												
Final Work Plan and SSHP/APP			40	22-Mar-17	16-May-17													
A3360	Prepare Final Work Plan (QAPP) and SSHP/APPP		10	22-Mar-17	04-Apr-17	█ Prepare Final Work Plan (QAPP) and SSHP/APPP												
A3370	Army, Regulator review of Final Work Plan (QAPP) and SSHP/APPP		20	05-Apr-17	02-May-17	█ Army, Regulator review of Final Work Plan (QAPP) and SSHP/APPP												
A3380	Response to Army, Regulator comments Final Work Plan (QAPP) and SSHP/APPP		10	03-May-17	16-May-17	█ Response to Army, Regulator comments Final Work Plan (QAPP) and SSHP/APPP												
A3390	Government approval of Final Work Plan (QAPP) and SSHP/APPP		0		16-May-17	◆ Government approval of Final Work Plan (QAPP) and SSHP/APPP												
001E - Explosives Site Plan			129	22-Nov-16	30-May-17													
Draft ESP			39	22-Nov-16	20-Jan-17													
A3480	Prepare Draft ESP		19	22-Nov-16	20-Dec-16	█ Prepare Draft ESP												
A3490	Army review of Draft ESP		20	21-Dec-16	20-Jan-17	█ Army review of Draft ESP												
A3500	Army COR approval of Draft ESP		0		20-Jan-17	◆ Army COR approval of Draft ESP												
Draft Final ESP			40	23-Jan-17	20-Mar-17													
A4870	Prepare Draft Final ESP		10	23-Jan-17	03-Feb-17	█ Prepare Draft Final ESP												
A4880	Huntsville review of Draft Final ESP		20	06-Feb-17	06-Mar-17	█ Huntsville review of Draft Final ESP												
A4890	Response to Huntsville comments Draft Final ESP		10	07-Mar-17	20-Mar-17	█ Response to Huntsville comments Draft Final ESP												

Activity ID	Activity Name	Org Dur	Start	Finish	2017					2018				2019			
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
A4900	Huntsville approval of Draft Final ESP	0		20-Mar-17			◆ Huntsville approval of Draft Final ESP										
Final ESP		50	21-Mar-17	30-May-17													
A3510	Prepare Final ESP	10	21-Mar-17	03-Apr-17			■ Prepare Final ESP										
A3520	DDESB review of Final ESP	30	04-Apr-17	15-May-17			■ DDESB review of Final ESP										
A3530	Response to DDESB comments Final ESP	10	16-May-17	30-May-17			■ Response to DDESB comments Final ESP										
A3540	Army COR approval of Final ESP	0		30-May-17			◆ Army COR approval of Final ESP										
001F - Geographical Information System (GIS) data/Conceptual Site Model (CSM)		70	09-Jan-17	18-Apr-17													
Draft (GIS) data / (CSM)		30	09-Jan-17	21-Feb-17													
A3630	Prepare Draft GIS data / CSM	10	09-Jan-17	23-Jan-17			■ Prepare Draft GIS data / CSM										
A3640	Army review of Draft GIS data / CSM	20	24-Jan-17	21-Feb-17			■ Army review of Draft GIS data / CSM										
A3650	Army COR approval of Draft GIS data / CSM	0		21-Feb-17			◆ Army COR approval of Draft GIS data / CSM										
Final (GIS) data / (CSM)		40	22-Feb-17	18-Apr-17													
A3660	Prepare Final GIS data / CSM	10	22-Feb-17	07-Mar-17			■ Prepare Final GIS data / CSM										
A3670	Army, Regulator review of Final GIS data / CSM	20	08-Mar-17	04-Apr-17			■ Army, Regulator review of Final GIS data / CSM										
A3680	Response to Army, Regulator comments Final GIS data / CSM	10	05-Apr-17	18-Apr-17			■ Response to Army, Regulator comments Final GIS data / CSM										
A3690	Government approval of Final GIS data / CSM	0		18-Apr-17			◆ Government approval of Final GIS data / CSM										
001G - Historical Records Search		90	22-Nov-16	04-Apr-17													
Draft Historical Records Report		50	22-Nov-16	06-Feb-17													
A3780	Prepare Draft Historical Records Report	30	22-Nov-16	06-Jan-17			■ Prepare Draft Historical Records Report										
A3790	Army review of Draft Historical Records Report	20	09-Jan-17	06-Feb-17			■ Army review of Draft Historical Records Report										
A3800	Army COR approval of Draft Historical Records Report	0		06-Feb-17			◆ Army COR approval of Draft Historical Records Report										
Final Historical Records Report		40	07-Feb-17	04-Apr-17													
A3810	Prepare Final Historical Records Report	10	07-Feb-17	21-Feb-17			■ Prepare Final Historical Records Report										
A3820	Army, Regulator review of Final Historical Records Report	20	22-Feb-17	21-Mar-17			■ Army, Regulator review of Final Historical Records Report										
A3830	Response to Army, Regulator comments Final Historical Records Report	10	22-Mar-17	04-Apr-17			■ Response to Army, Regulator comments Final Historical Records Report										
A3840	Government approval of Final Historical Records Report	0		04-Apr-17			◆ Government approval of Final Historical Records Report										
002 - Achieve Community Relations Support		388	09-Jan-17	25-Jul-18													
002A - Community Relations Plan		80	09-Jan-17	02-May-17													
Draft CRP		40	09-Jan-17	07-Mar-17													
A3930	Prepare Draft CRP	20	09-Jan-17	06-Feb-17			■ Prepare Draft CRP										
A3940	Army review of Draft CRP	20	07-Feb-17	07-Mar-17			■ Army review of Draft CRP										
A3950	Army COR approval of Draft CRP	0		07-Mar-17			◆ Army COR approval of Draft CRP										
Final CRP		40	08-Mar-17	02-May-17													
A3960	Prepare Final CRP	10	08-Mar-17	21-Mar-17			■ Prepare Final CRP										
A3970	Army, Regulator review of Final CRP	20	22-Mar-17	18-Apr-17			■ Army, Regulator review of Final CRP										
A3980	Response to Army, Regulator comments Final CRP	10	19-Apr-17	02-May-17			■ Response to Army, Regulator comments Final CRP										
A3990	Government approval of Final CRP	0		02-May-17			◆ Government approval of Final CRP										
002B - Public Meetings (2)		114	01-Jun-17	13-Nov-17													
A4110	Conduct Public Meeting	2	01-Jun-17	02-Jun-17													
A4120	Prepare Public Meeting Minutes	10	05-Jun-17	16-Jun-17			■ Prepare Public Meeting Minutes										
A4130	Submit Public Meeting Minutes	0		16-Jun-17			◆ Submit Public Meeting Minutes										
A4140	Conduct Public Meeting	2	26-Oct-17	27-Oct-17													
A4150	Prepare Public Meeting Minutes	10	30-Oct-17	13-Nov-17													
A4160	Submit Public Meeting Minutes	0		13-Nov-17													
002C - Presentation of Project (4)		318	19-Apr-17	25-Jul-18													
A4180	Prepare Presentation Slides	10	19-Apr-17	02-May-17			■ Prepare Presentation Slides										
A4190	Submit Presentation Slides	0		02-May-17			◆ Submit Presentation Slides										
A4200	Conduct Presentation of Project	2	03-May-17	04-May-17			■ Conduct Presentation of Project										
A4210	Prepare Presentation Slides	10	13-Sep-17	26-Sep-17													
A4220	Submit Presentation Slides	0		26-Sep-17			◆ Submit Presentation Slides										
A4230	Conduct Presentation of Project	2	27-Sep-17	28-Sep-17			■ Conduct Presentation of Project										
A4240	Prepare Presentation Slides	10	13-Feb-18	27-Feb-18													
A4250	Submit Presentation Slides	0		27-Feb-18			◆ Submit Presentation Slides										
A4260	Conduct Presentation of Project	2	28-Feb-18	01-Mar-18			■ Conduct Presentation of Project										
A4270	Prepare Presentation Slides	10	10-Jul-18	23-Jul-18													
A4280	Submit Presentation Slides	0		23-Jul-18			◆ Submit Presentation Slides										
A4290	Conduct Presentation of Project	2	24-Jul-18	25-Jul-18			■ Conduct Presentation of Project										

Remaining Level of Effort

Remaining Work

Critical Remaining Work

◆ ◆

 Milestone

PROJECT SCHEDULE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY AREA OF INTEREST NORTH of CASTNER RANGE,  
FORT BLISS FTBLS-007-R-01 EL PASO, TEXAS W912DY-10-D-0027-DS01 Page 2 of 5



Activity ID	Activity Name	Org Dur	Start	Finish	2017					2018				2019				
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
002D - Technical Project Planning (TPP) Meetings (3)		216	24-Jan-17	01-Dec-17														
A4300	Conduct TPP Meeting	2	24-Jan-17	25-Jan-17														
A4310	Prepare TPP Meeting Minutes	10	26-Jan-17	08-Feb-17														
A4320	Submit TPP Meeting Minutes	0		08-Feb-17														
A4330	Conduct TPP Meeting	2	19-Jun-17	20-Jun-17														
A4340	Prepare TPP Meeting Minutes	10	21-Jun-17	05-Jul-17														
A4350	Submit TPP Meeting Minutes	0		05-Jul-17														
A4360	Conduct TPP Meeting	2	14-Nov-17	15-Nov-17														
A4370	Prepare TPP Meeting Minutes	10	16-Nov-17	01-Dec-17														
A4380	Submit TPP Meeting Minutes	0		01-Dec-17														
002E - Restoration Advisory Board (RAB) Meetings (3)		216	04-May-17	16-Mar-18														
A4390	Conduct RAB Meeting	2	04-May-17	05-May-17														
A4400	Prepare RAB Meeting Minutes	10	08-May-17	19-May-17														
A4410	Submit RAB Meeting Minutes	0		19-May-17														
A5160	Conduct RAB Meeting	2	28-Sep-17	29-Sep-17														
A5170	Prepare RAB Meeting Minutes	10	02-Oct-17	16-Oct-17														
A5180	Submit RAB Meeting Minutes	0		16-Oct-17														
A5190	Conduct RAB Meeting	2	01-Mar-18	02-Mar-18														
A5200	Prepare RAB Meeting Minutes	10	05-Mar-18	16-Mar-18														
A5210	Submit RAB Meeting Minutes	0		16-Mar-18														
003 - Achieve RI at AOI North of Castner Range		224	31-May-17	23-Apr-18														
003A - Field Kick-off Meetings		12	31-May-17	15-Jun-17														
A4420	Conduct Field Kick-off Meetings	2	31-May-17	01-Jun-17														
A4430	Prepare Field Kick-off Meeting Minutes	10	02-Jun-17	15-Jun-17														
A4440	Submit Field Kick-off Meeting Minutes	0		15-Jun-17														
003B - Mobilization/Demobilization		67	02-Jun-17	06-Sep-17														
A4450	Mobilization	10	02-Jun-17	15-Jun-17														
A4460	Demobilization	10	23-Aug-17	06-Sep-17														
003C - Location Surveys and Mapping		37	16-Jun-17	08-Aug-17														
A4465	Conduct Location Surveys and Mapping	7	16-Jun-17	26-Jun-17														
A4470	Prepare Survey Data	10	27-Jun-17	11-Jul-17														
A4480	Army review of Survey Data	20	12-Jul-17	08-Aug-17														
A4490	Army COR approval of Survey Data	0		08-Aug-17														
003D - Geophysical/Visual Survey		45	27-Jun-17	29-Aug-17														
A4505	Conduct Geophysical/Visual Survey	15	27-Jun-17	18-Jul-17														
A4500	Vegetation Removal	2	27-Jun-17	28-Jun-17														
A4510	Prepare Geophysical Data	10	19-Jul-17	01-Aug-17														
A4520	Army review of Geophysical Data	20	02-Aug-17	29-Aug-17														
A4530	Army COR approval of Geophysical Data	0		29-Aug-17														
003E - MEC Characterization/Identification/Disposal		30	19-Jul-17	29-Aug-17														
A4740	MEC Identification / Disposal	15	19-Jul-17	08-Aug-17														
A4760	Prepare Field Activity Report	10	19-Jul-17	01-Aug-17														
A4770	Army review of Field Activity Report	20	02-Aug-17	29-Aug-17														
A4780	Army COR approval of Field Activity Report	0		29-Aug-17														
003F - MC Sampling		50	19-Jul-17	27-Sep-17														
A4790	MC Sampling	10	19-Jul-17	01-Aug-17														
A4800	Prepare Analytical Data	20	02-Aug-17	29-Aug-17														
A4810	Army review of Analytical Data	20	30-Aug-17	27-Sep-17														
A4820	Army COR approval of Analytical Data	0		27-Sep-17														
003G - Final RI Report for Closed Castner Firing Range		160	30-Aug-17	23-Apr-18														
Draft RI Report		60	30-Aug-17	28-Nov-17														
A2240	Prepare Draft RI Report	30	30-Aug-17	12-Oct-17														
A2250	Army review of Draft RI Report	20	13-Oct-17	09-Nov-17														
A2260	Response to Army comments Draft RI Report	10	13-Nov-17	28-Nov-17														
A2270	Army COR approval of Draft RI Report	0		28-Nov-17														
Draft Final RI Report		50	29-Nov-17	09-Feb-18														

Remaining Level of Effort

Remaining Work

Critical Remaining Work

Milestone



Activity ID	Activity Name	Org Dur	Start	Finish	2017					2018				2019			
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
A4910	Prepare Draft Final RI Report	20	29-Nov-17	27-Dec-17						■	■	■	■				
A4920	Regulator review of Draft Final RI Report	20	28-Dec-17	26-Jan-18						■	■	■	■				
A4930	Response to Regulator comments Draft Final RI Report	10	29-Jan-18	09-Feb-18						■	■	■	■				
A4940	Regulator approval of Draft Final RI Report	0		09-Feb-18						◆							
Final RI Report		50	12-Feb-18	23-Apr-18													
A2280	Prepare Final RI Report	20	12-Feb-18	12-Mar-18						■	■	■	■				
A2290	Regulator review of Final RI Report	20	13-Mar-18	09-Apr-18						■	■	■	■				
A2300	Response to Regulator comments Final RI Report	10	10-Apr-18	23-Apr-18						■	■	■	■				
A2310	Government approval of Final RI Report	0		23-Apr-18						◆							
004 - Achieve FS at AOI North of Castner Range		150	13-Mar-18	12-Oct-18													
Feasibility Study		30	13-Mar-18	23-Apr-18													
A2580	Conduct Feasibility Study	30	13-Mar-18	23-Apr-18						■	■	■	■				
Draft FS Report		40	24-Apr-18	19-Jun-18													
A1100	Prepare Draft FS Report	10	24-Apr-18	07-May-18						■	■	■	■				
A1110	Army review of Draft FS Report	20	08-May-18	05-Jun-18						■	■	■	■				
A1120	Response to Army comments Draft FS Report	10	06-Jun-18	19-Jun-18						■	■	■	■				
A1130	Army COR approval of Draft FS Report	0		19-Jun-18						◆							
Draft Final FS Report		40	20-Jun-18	15-Aug-18													
A4950	Prepare Draft Final FS Report	10	20-Jun-18	03-Jul-18						■	■	■	■				
A4960	Regulator review of Draft Final FS Report	20	05-Jul-18	01-Aug-18						■	■	■	■				
A4970	Response to Regulator comments Draft Final FS Report	10	02-Aug-18	15-Aug-18						■	■	■	■				
A4980	Regulator approval of Draft Final FS Report	0		15-Aug-18						◆							
Final FS Report		40	16-Aug-18	12-Oct-18													
A1140	Prepare Final FS Report	10	16-Aug-18	29-Aug-18						■	■	■	■				
A1150	Regulator review of Final FS Report	20	30-Aug-18	27-Sep-18						■	■	■	■				
A1160	Response to Regulator comments Final FS Report	10	28-Sep-18	12-Oct-18						■	■	■	■				
A1170	Government approval of Final FS Report	0		12-Oct-18						◆							
005 - Achieve PP at AOI North of Castner Range		150	30-Aug-18	09-Apr-19													
Draft PP		50	30-Aug-18	09-Nov-18													
A1360	Prepare Draft PP	20	30-Aug-18	27-Sep-18						■	■	■	■				
A1370	Army review of Draft PP	20	28-Sep-18	26-Oct-18						■	■	■	■				
A1380	Response to Army comments Draft PP	10	29-Oct-18	09-Nov-18						■	■	■	■				
A1390	Army COR approval of Draft PP	0		09-Nov-18						◆							
Draft Final PP		50	13-Nov-18	28-Jan-19													
A4990	Prepare Draft Final PP	20	13-Nov-18	12-Dec-18						■	■	■	■				
A5000	Regulator review of Draft Final PP	20	13-Dec-18	11-Jan-19						■	■	■	■				
A5010	Response to Regulator comments Draft Final PP	10	14-Jan-19	28-Jan-19						■	■	■	■				
A5020	Regulator approval of Draft Final PP	0		28-Jan-19						◆							
Final PP		50	29-Jan-19	09-Apr-19													
A1400	Prepare Final PP	10	29-Jan-19	11-Feb-19						■	■	■	■				
A1410	Regulator review of Final PP	20	12-Feb-19	12-Mar-19						■	■	■	■				
A1401	Public Review of PP	30	12-Feb-19	26-Mar-19						■	■	■	■				
A1420	Response to Regulator comments Final PP	10	27-Mar-19	09-Apr-19						■	■	■	■				
A1430	Government approval of Final PP	0		09-Apr-19						◆							
006 - Achieve DD at AOI North of Castner Range		160	29-Jan-19	13-Sep-19													
Draft DD		50	29-Jan-19	09-Apr-19													
A1440	Prepare Draft ROD	20	29-Jan-19	26-Feb-19						■	■	■	■				
A1450	Army review of Draft ROD	20	27-Feb-19	26-Mar-19						■	■	■	■				
A1460	Response to Army comments Draft ROD	10	27-Mar-19	09-Apr-19						■	■	■	■				
A1470	Army COR approval of Draft ROD	0		09-Apr-19						◆							
Draft Final DD		40	10-Apr-19	05-Jun-19													
A5040	Prepare Draft Final ROD	10	10-Apr-19	23-Apr-19						■	■	■	■				
A5050	Regulator review of Draft Final ROD	20	24-Apr-19	21-May-19						■	■	■	■				
A5060	Response to Regulator comments Draft Final ROD	10	22-May-19	05-Jun-19						■	■	■	■				
A5070	Regulator approval of Draft Final ROD	0		05-Jun-19						◆							

Remaining Level of Effort

Remaining Work

■

Critical Remaining Work

◆ ◆

Milestone



Activity ID	Activity Name	Org Dur	Start	Finish	2017					2018				2019			
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Final DD		70	06-Jun-19	13-Sep-19													
A1480	Prepare Final ROD	10	06-Jun-19	19-Jun-19												■	Prepare Final ROD
A1490	Regulator review of Final ROD	20	20-Jun-19	18-Jul-19												■	Regulator review of Final ROD
A1500	Response to Regulator comments Final ROD	10	19-Jul-19	01-Aug-19												■	Response to Regulator comments Final ROD
A1505	ROD Signature	30	02-Aug-19	13-Sep-19												■	ROD Signature
A1510	Government approval of Final ROD	0		13-Sep-19												◆	Government approval of Final ROD
007 - Prepare and Provide Access to Administrative Record for AOI		35	02-Aug-19	20-Sep-19													
Administrative Record Package		35	02-Aug-19	20-Sep-19													
A4540	Prepare Administrative Record Package	10	02-Aug-19	15-Aug-19												■	Prepare Administrative Record Package
A4550	Army review of Administrative Record Package	20	16-Aug-19	13-Sep-19												■	Army review of Administrative Record Package
A4560	Response to Army comments Administrative Record Package	5	16-Sep-19	20-Sep-19												■	Response to Army comments Administrative Record Package
A4570	Army COR approval of Administrative Record Package	0		20-Sep-19												◆	Army COR approval of Administrative Record Package
008 - Achieve Fencing and Signage for Archeology and Border Patrol		64	09-Aug-17	08-Nov-17													
Final Fencing Completion Letter		64	09-Aug-17	08-Nov-17													
A4700	Install Fence	10	09-Aug-17	22-Aug-17												■	Install Fence
A4660	Prepare Final Completion Letter	30	23-Aug-17	04-Oct-17												■	Prepare Final Completion Letter
A4670	Regulator review of Final Completion Letter	14	05-Oct-17	25-Oct-17												■	Regulator review of Final Completion Letter
A4680	Response to Regulator comments Final Completion Letter	10	26-Oct-17	08-Nov-17												■	Response to Regulator comments Final Completion Letter
A4690	Government approval of Final Completion Letter	0		08-Nov-17												◆	Government approval of Final Completion Letter

**ATTACHMENT B**  
**PERFORMANCE WORK STATEMENT**  
**(Provided on CD)**

**PERFORMANCE WORK STATEMENT  
REMEDIAL INVESTIGATION/FEASIBILITY STUDY  
AREA OF INTEREST NORTH of CASTNER RANGE, FORT BLISS  
FTBLS-007-R-01**

**EL PASO, TEXAS**

**ENVIRONMENTAL REMEDIATION SERVICES CONTRACT**

**Solicitation Number: W912DY-10-D-0022, W912DY-10-D-0023, W912DY-10-D- 0025,  
W912DY-10-D-0026, W912DY-10-D-0027, and W912DY-10-D-0028**

**15 June 2016**

**1.0 Background and Introduction**

This Performance Work Statement (PWS) is for soliciting proposals under the Small Business/Unrestricted Worldwide Environmental Remediation Services (WERS) Performance Based Acquisition (PBA) held by the U.S. Army Corps of Engineers (USACE) Huntsville District; reference solicitation number W912DY-10-D-0022, W912DY-10-D-0023, W912DY-10-D-0024, W912DY-10-D-0025, W912DY-10-D-0026, W912DY-10-D-0027, and W912DY-10-D-0028. The project is under the U.S. Army Environmental Command (AEC) Military Munitions Response Program (MMRP), performed IAW ER 200-3-1. The objective is AEC approval of Munitions and Explosives of Concern (MEC) Remedial Investigation (RI)/Feasibility Study (FS) for Area of Interest (AOI) North of Castner Range at Fort Bliss. There is also a task to erect fencing and signage around the Archeology and Border Patrol Museums area located on the Closed Castner Range.

The AOI North of Castner Range is 4,909 acres in El Paso County. It is located north of the Closed Castner Range, not owned by Fort Bliss, and is bounded by Martin Luther King Boulevard on the east and the Franklin Mountain State Park on the west. Housing developments exist to the south and a quarry is in operation just north of the northern boundary.

Records show that this area was never owned or leased by Fort Bliss and there is no record of it having been used by Fort Bliss. However, an Open Burn/Open Detonation (OB/OD) area is located just south of the AOI in the Closed Castner Range. A MEC Reconnaissance Survey was conducted from 2013-2015 by USACE – Huntsville District. The survey discovered multiple items of Munitions Debris (MD) but no MEC. Although no records exist of military use in this area, it is assumed by AEC that the MD comes from the Fort Bliss Closed Castner Range either as kick-out debris from the OB/OD unit or possibly from overshoot during training exercises.

Current land uses in the AOI North of Castner Range include private residences, ranching, and state park land. The area is currently owned by the State of Texas (Franklin Mountain State Park) and the City of El Paso.

The work required under this PWS falls under the Defense Environmental Restoration Program – Military Munitions response Program (DERP-MMRP). The contractor shall perform all work in accordance with

(IAW) federal, state, and local statutes, regulations, and guidance. As such, all MEC associated work will be consistent with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), The National Oil and Hazardous substances Pollution Contingency Plan (NCP)(40CFR§300), Executive Order (EO) 12580, Chapter 29 of the Code of Federal Regulations (CFR) Section 1910.120, and USACE, Department of the Army (DA), and Department of Defense (DoD) safety requirements regarding personnel, equipment, and procedures as they pertain to MECs, obtaining permits, and making proper notifications and contacts necessary for implementation of project tasks in coordination with the USACE Contracting Officer's Representative (COR). Note that CERCLA has no special provisions for dealing with explosive safety, and as such, the Contractor should refer to DoD's recently revised Explosives Safety Standards [DoD 6055.09-STD (Feb 2008)]. All elements of the task order shall be completed in accordance with all USAEC and USACE guidance including, but not limited to, U.S. Army Corps of Engineers (USACE) Engineering Pamphlet EP 1110-1-18 for Military Munitions Response Process and Engineering, EM 385-1-97 Explosive Safety and Health Requirements Manual and Engineering Manual EM 200-115..

The Contractor shall be responsible for fully executing the Firm Fixed Price (FFP) portion of the task order under a Performance-Based Acquisition (PBA) approach. The Contractor will conduct required environmental investigation services for which the United States Department of the Army (the "Army") is statutorily responsible; addressing any and all environmental, explosive safety, scheduling, and regulatory issues; and, assuming contractual liability and responsibility for the achievement of the performance objectives for the aforementioned site.

The contractor must possess all the required expertise, knowledge, equipment and tools required to meet or exceed the government's objectives identified in this PWS in accordance with established industry standards. The Contractor must have the capability and experience to perform, or provide, a wide range of investigative services required for hazardous substance and waste sites and munitions and explosives of concern (MEC). Work will include, for example, site characterization and evaluation of remedial alternatives.

Under this contract, the contractor will perform munitions response actions for military munitions (MM) and munitions debris (MD). Activities may involve munitions and explosives of concern (MEC), which includes UXO, DMM, and Munitions Constituents (MC) if found in high enough concentrations to cause an explosive threat, non-explosive concentrations of MC and incidental contaminants related to MM.

It is the Contractor's responsibility to comply with all applicable federal, state and local laws and regulations and to fulfill the performance objectives of this PWS in a manner that is consistent with any applicable orders or permits, all existing cleanup agreements or guidance for the Installation, and relevant Department of Defense (DoD) and Army policy, for the duration of the contract.

The Contractor must perform all necessary work, as required, to meet the performance objectives of this PWS. Remedial Investigation at the AOI North of Castner Range is conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and National Oil and Hazardous Substances Contingency Plan (NCP) requirements, and under the State of Texas Voluntary Cleanup Program, with regulatory coordination, as appropriate, of the Texas Commission for Environmental Quality (TCEQ). The AOI North of Castner Range is not on the National Priorities List (NPL).

Texas Commission on Environmental Quality (TCEQ) and U.S. Environmental Protection Agency (USEPA) Region 6 are the regulatory agencies for this site. TCEQ is the lead regulatory agency.

## 2.0 Types of Services Required

This PWS includes services as authorized under the Environmental Remediation Services (ERS) Multiple Award Task Order Contract (MATOC) awarded by the US Army Corps of Engineers (USACE)-Tulsa District. These services may include, but are not limited to all aspects of CERCLA phases of Remedial Investigation and Feasibility Study.

## 3.0 Performance Objectives and Standards

The Contractor shall be required to furnish all plant, labor, materials and equipment necessary to meet the performance objectives and standards identified in Table 1 below.

**Table 1.** Performance Objectives Summary.

CLIN	Performance Objective	Performance Standard
001	Achieve Planning Documents	Army approval of final Planning Documents through the COR.
002	Achieve Community Relations Support	Army Approval of Community Relations Plan (CRP) and meeting minutes.
003	Achieve Remedial Investigation (RI)	Army approval of RI report through the COR followed by TCEQ approval.
004	Achieve Feasibility Study (FS).	Army approval of FS report through the COR followed by TCEQ approval.
005	Achieve approved Proposed Plan (PP)	Army approval of PP report through the COR followed by TCEQ approval.
006	Achieve approved Decision Document (DD).	Army approval of final DD through the COR followed by TCEQ approval.
007	Achieve Administrative Record	Army approval of Administrative Record
008	Achieve fencing and signage for museum area	Army Approval of Completion Letter

There may be multiple milestones and/or deliverables for each performance objective (see Section 4.3). Payments will be based on successful completion of the milestones. Final decisions regarding the adequacy of milestone and deliverable completion resides with the COR (see Section 8.2), with appropriate acceptance and approval of necessary documentation by regulators, consistent with applicable regulatory drivers listed in Section 1.0 of this PWS and consistent with the Performance Requirement Summary in Table 2. For the duration of the contract, the Contractor shall remain responsible for corrections.

**Table 2.** Performance Requirements Summary

<b>Desired Outcomes</b>	<b>Required Services</b>	<b>Performance Standards</b>	<b>Monitoring Method</b>	<b>Incentive/Disincentives for Meeting or Not Meeting the Acceptable Quality Level</b>
<b>Quality Control/Assurance &amp; Safety</b>				
Safety	Maintain high safety standards	Zero Class A Safety Violations (CONUS only) where the contractor is determined at fault.	Submission of accident reports, adverse safety inspection reports, and similar documents.	Issuance of a cure notice and possible termination of task order or contract for continuous or uncorrected safety violations. Adverse past performance reports. The contractor may be in danger of not having its option period exercised.
Performance	Compliance with PWS and referenced applicable regulations	No more than five Corrective Action Reports (CARs) received by the contractor within a given task order.	COR Submission of CARs, COR report of failure to deliver acceptable product or service in accordance with Performance-Based Milestones/Objectives	Issuance of a cure notice and possible termination of task order or contract for continuous or uncorrected performance deficiencies, or for failure to complete Performance-Based Milestones/Objectives. Adverse past performance reports. The contractor may be in danger of not having its option period exercised.

## **4.0 Project Management**

The PBA approach requires careful coordination of project activities to ensure that all stakeholders are kept informed of the project status, existing or potential problems, and any changes required to prudently manage the project and meet the needs of the project stakeholders and decision-makers.

### **4.1 Deliverables and Review Schedule**

All documents must be produced as Draft, Draft-Final, and Final versions. **Five (5) copies of each deliverable are required (hard copy with one CD/DVD per hard copy).** With COR concurrence, the Contractor may coordinate with appropriate agencies to determine if fewer versions of each deliverable are sufficient for review. The Government (primarily USACE and Fort Bliss), through the COR, will receive documents and coordinate review and comment. Once initial comments are addressed, the Government will review draft final documents

before submission to appropriate agencies, allowing for a maximum of 45 calendar days for review per deliverable.

## 4.2 Project Schedule

As part of each of the PMP, the Contractor shall develop and maintain an Activity-Based Schedule that fully supports the technical approach and outlines activities and milestones defined at the appropriate detail level; logically sequenced to support and manage completion of the performance objectives in the PWS and which allows for sufficient review time of deliverables. Additionally, the due dates for all payable deliverables shall be identified. A payment plan shall be included with the schedule that may allow for payments to the Contractor based on successful completion of interim milestones proposed by the Contractor. Activities identified in the respective QASPs should be appropriately coded in the project schedule to allow for planning of QA inspections. It is the Army's intent to make all payments after verification of milestone completion in accordance with each task's schedule. All performance objectives must be completed within the allowable contract period of performance. The Contractor shall need to take into account the existing or future schedules developed under the applicable regulatory drivers listed in Section 1.0 of this PWS. The Contractor shall also need to coordinate activities with the COR to ensure that the proposed project task schedules do not conflict with other contractor activities on site, or interrupt Installation mission activities.

As part of the PMP, the Contractor shall identify and implement a means for providing project status reports to the COR. The PMPs shall address the frequency and content of status reports.

The Contractor shall update the PMP to reflect progress towards achievement of the performance objectives and delineate proposed actions to accomplish future project milestones.

## 4.3 Milestone Presentations

Milestone presentations shall be made to the COR at the completion of each milestone below to provide analysis and lessons learned, and to present approaches for completion of future milestones. At the COR's request, the Contractor may also make milestone presentations to the other project stakeholders, consistent with the applicable regulatory drivers listed in Section 1.0 of this PWS, to show achievement of the performance objectives.

The Contractor may propose interim milestones to the Major Milestones below (Table 3). Interim milestones will only be accepted if they represent significant progress toward milestone completion, and completion of these interim steps can be measured and demonstrated. As noted in Section 3.0, payments will be tied to the successful completion of the following milestones or an interim milestone plan approved by the Army, through the COR. To that end, all proposed interim milestones should be associated with required deliverables. All milestones must have a defined means for demonstrating completion in order to facilitate certification and approval (see Section 8.2 of this PWS, Certification and Approval of Project Milestones and Deliverables).

**Major Milestones:**

- Approval of Final PMP, QASP, and work planning documents
- Approval Community Relations Support;
- Approval of Final RI Report;
- Approval of Final Feasibility Study Report;
- Approval of Final Proposed Plan;
- Approval of Final Decision Document;
- Approval of Administrative Record.
- Approval of Fencing/Signage Completion Letter

**Table 3. Payment Milestones.**

<b>PWS Section</b>	<b>CLIN</b>	<b>PERFORMANCE OBJECTIVE</b>	<b>Deliverable</b>	<b>PERFORMANCE APPROVAL STANDARDS</b>
<b>7.1</b>	<b>001</b>	<b>Achieve Planning Documents for AOI North of Castner Range</b>		
7.1.1	001A	Project Kick-off Meeting	Meeting minutes	Gov't approval of meeting minutes
7.1.2	001B	Project Management Plan (PMP)	PMP	Gov't approval of final PMP
7.1.3	001C	Quality Assurance Project Plan (QASP)	QASP	Gov't approval of final QASP
7.1.4	001D	Work Plan and SSHP/APP	Work Plan, SSHP/APP	Gov't approval of final Work Plan, SSHP/APP
7.1.5	001E	Explosives Site Plan	ESP	Gov't approval of final ESP
7.1.6	001F	Geographical Information System (GIS) data/Conceptual Site Model (CSM)	GIS data/CSM	Gov't approval of GIS data/Final CSM
7.1.7	001G	Historical Records Search	Historical Records Report	Gov't approval of Historical Records Report
<b>7.2</b>	<b>002</b>	<b>Achieve Community Relations Support</b>		
7.2.1	002A	Community Relations Plan	CRP	Gov't approval of final CRP
7.2.2	002B	Public Meetings (2)	Meeting minutes	Gov't approval of meeting minutes
7.2.3	002C	Presentation of Project (4)	Presentation slides	Gov't approval of presentation
7.2.4	002D	Technical Project Planning (TPP) Meetings (3)	Meeting minutes	Gov't approval of meeting minutes
7.2.5	002E	Restoration Advisory Board (RAB) Meetings (3)	Meeting minutes	Gov't approval of meeting minutes
<b>7.3</b>	<b>003</b>	<b>Achieve RI at AOI North of Castner Range</b>		
7.3.1	003A	Field Kick-off Meetings	Meeting minutes	Gov't approval of meeting minutes
7.3.2	003B	Mobilization/Demobilization	Field activity report	Gov't approval of field activity report
7.3.3	003C	Location Surveys and Mapping	Survey data	Gov't approval of final survey data
7.3.4	003D	Geophysical/Visual Survey	Geophysical data	Gov't approval of final geophysical data
7.3.5	003E	MEC Characterization/Identification/Disposal	Field activity report	Gov't approval of field activity report
7.3.6	003F	MC Sampling	Analytical data	Gov't approval of final analytical data
7.3.7	003G	Final RI Report for Closed Castner Firing Range	Final RI report	Gov't approval of final RI report
<b>7.4</b>	<b>004</b>	<b>Achieve FS at AOI North of Castner Range</b>	Final FS Report	Gov't approval of final FS report
<b>7.5</b>	<b>005</b>	<b>Achieve PP at AOI North of Castner Range</b>	Final PP	Gov't approval of final PP
<b>7.6</b>	<b>006</b>	<b>Achieve DD at AOI North of Castner Range</b>	Final DD	Gov't approval of final DD
<b>7.7</b>	<b>007</b>	<b>Prepare and Provide Access to Administrative Record for AOI North of Castner Range</b>	Final Administrative Record	Gov't approval of structured Project File Record on CD/DVD; to include table of contents, all project correspondence, e-mail, Draft, Draft Final and Final Documents, etc.

7.8	008	Achieve Fencing and Signage for Archeology and Border Patrol Museum Area	Final Completion Letter	Gov't approval of final Completion Letter.
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## **5.0 Expertise and Necessary Personnel**

The Contractor shall provide the necessary personnel and equipment to successfully execute this PWS. The Contractor is responsible for determining the requirements for licensed professionals and certifications.

The Contractor shall furnish all plant, labor, materials and equipment necessary to meet the performance objectives. The Contractor shall provide personnel trained as required by the Occupational Safety and Health Administration (OSHA) and all other applicable federal and state regulations. The Contractor shall provide all support activities necessary to ensure the safe and effective accomplishment of all work. For all work performed under this contract, the Contractor shall also develop and implement quality control measures consistent with all applicable federal and state regulatory requirements and standards.

The Contractor shall propose key personnel required to achieve the objectives. The Government reserves the right to have the contractor replace key personnel if project objectives are not being met or the personnel does not possess the minimum qualifications or experience necessary to perform the assigned responsibilities. The Contractor shall notify the COR of any changes in key personnel. The change of key personnel is subject to approval by the CO, although such approval will not be unreasonably withheld provided replacement personnel are of the same quality as originally proposed.

## **6.0 Performance**

### **6.1 Place of Performance**

Work will be performed at the off-site Contractor offices as agreed to by both parties for proper performance of this contract.

### **6.2 Period of Performance**

The period of performance for all CLINs will not exceed September 30, 2019.

### **6.3 CLIN Structure**

Refer to provided CLIN Structure in Table 1.

### **6.4 Performance Requirements**

The Contractor shall identify applicable federal, state and local laws and regulations; agreements, or rules; and perform its work in accordance with said authorities. The Contractor shall ensure that all activities performed by its personnel, subcontractors and suppliers are executed in accordance with said authorities. Any incident of noncompliance noted by the Contractor shall immediately be brought to the attention of the COR telephonically and then by written notice. Nothing in this contract shall relieve the Contractor of its responsibility to comply with applicable laws and regulations. The Contractor shall obtain all permits, licenses, approvals,

and/or certificates required or necessary to accomplish the work. When the work to be performed requires facility clearances, such as digging or drilling permits, the Contractor shall obtain such clearances and/or permits prior to any drilling or excavating operations. Contractors on environmental sites are required to perform their own utility checks. The Contractor shall comply with all time and procedural requirements (federal, state, and local) described in the permits obtained. Conditions at these sites may include, but are not limited to, potential endangered species habitat areas or other natural or cultural resource concerns. The Army technical experts will also independently review Contractor work to ensure compliance with all applicable requirements.

The Contractor shall adhere to all applicable federal, DoD, and Army geospatial data standards for tasks and deliverables in this PWS. Spatial data must be compliant with the Spatial Data Standards for Facilities, Infrastructure, and Environment v2.6. Spatial data must meet the requirements of the associated Quality Assurance Plan (QAP). If no QAP exists for the data layers developed, the Contractor shall meet the minimum requirements listed in Attachment D. Each geospatial data set shall be accompanied by metadata conforming to the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM) and the Army Installation Geospatial Information & Services (IGI&S) Metadata Standard, v1. The horizontal accuracy of any geospatial data created by the contractor shall be tested and reported in accordance with the National Standard for Spatial Data Accuracy (NSSDA) and the results shall be recorded in the metadata. All data must have a datum of WGS84 and a defined projection. Army technical experts will independently review Contractor work to ensure compliance with all spatial data requirements. Subject matter experts may review Contractor work and validate geospatial data.

The Contractor shall review and fully understand “Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management,” in particular those requirements pertaining to environmental management system (EMS). The Contractor shall also be required to review and adhere to the installation’s environmental management system, including environmental policy and significant aspects/impacts.

The Contractor shall consider and implement green response/remediation strategies and applications to maximize sustainability, reduce energy and water usage, promote carbon neutrality, promote industrial materials reuse and recycling, and protect and preserve land resources, consistent with DoD’s Policy on Consideration of Green and Sustainable Remediation Practices in the Defense Environmental Restoration Program. The contractor shall present green remediation options and approaches in its work plans, maintain records of “green-related” activities, and report this information to the COR in its project status report.

#### 6.4.1 MEC Related Guidance

MEC related guidance includes, but may not be limited to, the following:

- MEC includes: UXO, as defined in 10 U.S.C. 101(e) (5); DMM, as defined in 10 U.S.C. 2710(e) (2); or Munitions Constituents (MC), as defined in 10 U.S.C. 2710(e) (3) (Reference (ai)), present in high enough concentrations to pose an explosive hazard.

- MEC distinguishes specific categories of military munitions that may pose unique explosives safety risks. Because MEC that is actively managed may be determined to be hazardous waste, Hazardous Waste Operations and Emergency Response, Section 1910.120 may apply.

Per the guidelines set forth in DoDI 4140.62 and DDESB Technical Paper 18, UXO qualified personnel will be responsible for determining the explosive safety status of any material recovered that may pose an explosive hazard (i.e., material potentially presenting an explosive hazard (MPPEH)).

#### 6.4.2 MEC Encounters

Should MEC be encountered during RI activities at the site, the Contractor's UXO qualified personnel will evaluate the explosive hazard, provide notifications per the approved Project Management Plan, and remove the explosive hazard; to include open detonation in place; as applicable. This response will be conducted per the CERCLA and the NCP, applicable state and federal regulations, and applicable DoD, U.S. Army policies and procedures.

#### 6.4.3 Health and Safety Requirements

Prior to beginning any field work, the Contractor shall implement a written Safety and Health Program compliant with federal, state, and local laws and regulations and approved by the Contracting Officer (KO). The Contractor shall ensure that its subcontractors, suppliers and support personnel comply with the approved Site Safety and Health Plan/Accident Prevention Plan (SSHP/APP). The Army reserves the right to stop work under this contract for any violations of the SSHP/APP at no additional cost to the Army. Once the Army verifies through the COR that the violation has been corrected, the Contractor shall be able to continue work. As a minimum, the SSHP/APP shall contain the following elements: site description and contaminant characterization, safety and health hazard(s) assessment and risk analysis, safety and health staff organization and responsibilities, site specific training and medical surveillance parameters, personal protective equipment (PPE) and decontamination facilities and procedures to be used, monitoring and sampling required, safety and health work precautions and procedures, site control measures, on-site first aid and emergency equipment, emergency response plans and contingency procedures (on-site and off-site), logs, reports, and record keeping. Training and medical screening per 29 CFR 1910.120(e) is required for the contract.

Additionally, the Contractor must adhere to all USAEC and USACE guidance including, but not limited to DoD and DA policies, procedures and regulations for munitions response, along with USACE Tulsa requirements and procedures. This includes but is not limited to DoD 6055.09-STD, DoD Ammunition and Explosives Safety Standards; Army Regulation 385-10, the Army Safety Program; Department of Army Pamphlet 385-63, Range Safety; and Department of Army Pamphlet 385-64, Ammunition and Explosives Safety Standards, Department of the Army EM 385-1-97, Explosive Safety and Health Requirements Manual.

None of the site under this PWS is suspected to contain Chemical Warfare Materiel (CWM); however, if suspect CWM is encountered during any phase of site activities the Contractor shall immediately halt operations and contact the COR for assistance and guidance.

All activities involving work in areas potentially containing MEC hazards shall be conducted in full compliance with Department of Army, state, and local requirements regarding personnel, equipment and procedures, and DoD Standard Operating Procedures and safety regulations.

#### 6.4.4 Personnel Qualifications and Work Week

Personnel involved in certain munitions response activities will, as required, meet the qualifications set forth in USAEC and USACE guidance including, but not limited to the most current version of DDESB, Technical Paper (TP) 18 – Minimum Qualifications for UXO Technicians and UXO-Qualified Personnel. Due to the inherent risks associated with munitions response activities, personnel performing munitions response activities that present an explosive risk shall be subject to work hour limitations, unless specifically authorized by the COR.

#### 6.4.5 Safety Documentation and Reporting

Army Engineering Manual 385-1-1, part 01.D "Accident Reporting and Recordkeeping" is required for the work identified in this PWS. The Contractor will comply with all USAEC and USACE guidance.

#### 6.4.6 Quality Management

The Contractor must ensure that the quality of all work performed or produced under this contract meets Army approval, through the COR. The Contractor's Quality Control Plans must be prepared and approved by the COR prior to performance of physical work.

Since the technical approach for this PBA shall be developed by the Contractor, the Contractor shall also develop a proposed Quality Assurance Surveillance Plan (QASP) for each task for use by the Army. A Draft QASP using the template provided in Attachment E and incorporating the Performance Objectives and Requirements Summaries in Table 1 and 2 of the PWS shall be submitted with the PMP deliverable within thirty (30) calendar days of award. The Final QASPs will be prepared by the Army.

The QASPs should highlight key quality control activities or events that the COR will use to determine when Army (COR or KO) inspections can be conducted to assess progress toward and/or completion of milestones. Activities identified in the QASPs should be appropriately coded in the project schedule to allow for planning of QA inspections.

#### 6.4.7 Quality Control

##### 6.4.7.1 Quality Control for Chemical Analyses

Quality Control shall be provided whenever sampling or analysis for chemical constituents is required in order to achieve milestones. Quality control for traditional soils or geotechnical testing shall also be included. All sampling and analysis shall comply with the requirements of the most recently approved DoD Quality Systems Manual (QSM). Laboratories to be used by the Contractor shall be DoD Environmental Laboratory Accreditation Program (DoD ELAP) certified. The Contractor may establish an on-site testing laboratory at the project site if determined necessary by the Contractor. However, on-site testing laboratory (ies) shall be DoD ELAP certified or equivalent and meet the requirements of USEPA, specific state regulator requirements, and all requirements of the most recently approved DoD Quality Systems Manual (QSM).

#### 6.4.7.2 Quality Assurance/Quality Control UFP-QAPP

Following contract award and during project implementation, the Contractor shall develop and submit documentation of project-specific quality assurance (QA) and QC activities prepared in accordance with the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP). The government will review and return the quality systems documentation, with comments, indicating acceptance or rejection. If necessary, the Contractor shall revise the documentation to address all comments and shall submit the revised documentation to the Government for acceptance. In addition, the Contractor shall develop and submit Quality Control Summary Reports to summarize the quality control details of the contract project. The problems and successes of the work done to control the quality of the chemical measuring activities and other chemically related cleanup activities shall be included in the summary reports. The UFP-QAPP can be a stand-alone document or added as an appendix to the work plan.

#### 6.4.7.3 Data Validation

The Contractor shall conduct data validation as specified in the U.S. EPA Protocols. The data validation process will be conducted according to the method specific SOPs, project specific QAP, DoD QSMs and will be validated and qualified using the U.S. EPA National Functional guidelines, as appropriate. The validation shall be performed as required in accordance with the approved SAP and documented in the RI Report. The document of data validation documentation should address review of the results and data qualifiers of laboratory/field QC and primary field samples.

#### 6.4.7.4 Data Quality

The Contractor shall provide data quality of a level sufficient for the support of project objectives as specified in the approved QAPP. The Contractor shall provide QC of the various analytical tasks performed. The Contractor is responsible for achieving the data quality specified in the approved QAPP. Analytical data that does not meet QA requirements may be rejected by the Government; to be corrected at the Contractor's expense.

#### 6.4.8 Project Repository and Administrative Record

The Contractor shall update at least monthly a multimedia (i.e., both paper and electronic format) project repository of all project-related information to ensure that pertinent documentation and data are available for project reviews, and to provide a clear record of the PBA approach to support final decisions and completion. This repository is the property of the Army and available to the Army upon request by the COR or KO.

"Project-related information" includes all previous environmental restoration documentation of a technical nature developed by the Army and previous Army contractors for the sites specified in this PWS, and all the documentation developed by the Contractor in order to achieve the performance objectives specified in this PWS. Documents generated prior to the PBA are not expected to be stored in electronic format; however, all documents generated by the Contractor shall be maintained in multi-media form.

The project repository and Administrative Record shall be updated by the Contractor IAW the requirements in section 6.4.13.1 of this PWS, and made available to the public, for the duration of the contract. Final electronic document files must be in text-searchable PDF format and be accompanied by defined metadata for upload into the Army Repository of Environmental Documents (READ). The Army, through the COR, will provide the metadata field requirements for READ to the Contractor.

#### 6.4.9 Army Environmental Database and Environmental Restoration Information System

The Contractor shall upload all generated analytical data into the Environmental Restoration Information System (ERIS) on a quarterly basis. The Army, through the COR, will provide data specifications for AEDB-R and ERIS to the Contractor. The Contractor shall comply with all applicable requirements for data validation and submission.

#### 6.4.10 Protection of Property

The Contractor shall be responsible for any damage caused to property of the United States (Federal property) or private landowners by the activities of the Contractor under this contract and shall exercise due diligence in the protection of all property located on the premises against fire or damage from any and all other causes. Any property of the United States or private landowners damaged or destroyed by the Contractor incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the Contractor to a condition satisfactory to the COR or reimbursement is made by the Contractor sufficient to restore or replace the property to a condition satisfactory to the COR in accordance with FAR Clause 52.245-2.

#### 6.4.11 Project Stakeholders

For the purposes of this PWS, project stakeholders include the Army, TCEQ, and Property Owners. The Contractor shall be responsible for assisting Fort Bliss in obtaining comments with

appropriate approval or concurrence on project deliverables consistent with applicable regulatory drivers and agreements for the site.

#### 6.4.12 Regulatory Involvement

All regulatory coordination shall be approved by the Army through the COR. The Contractor shall provide the necessary support to initiate, schedule, and address all regulatory aspects of the project (e.g., organizing discussions with regulators concerning site response objectives and completion requirements, obtaining regulator comments on site documents and appropriately addressing them, and obtaining written documentation of RI completion from the regulators for all of the sites identified in this PWS). The COR, or designee, will attend and represent the Army at all meetings with the regulators. With approval of the COR, the contractor may also informally discuss investigation issues with regulators and provide an after-action report to the COR. The Army will be the signature authority for all regulatory agreements and documents.

#### 6.4.13 Public Involvement

All public participation coordination shall be approved by the Army through the COR. The Contractor shall provide the necessary support to initiate, schedule, and address all public participation aspects of the project (e.g., preparation of briefings, presentations, fact sheets, newsletters, articles/public notices to news media). The Contractor shall be responsible for requesting and addressing all public comments consistent with the applicable regulatory drivers listed in Section 1.0 of this PWS. The COR, or designee, will attend and represent the Army at all meetings with the public.

Under CLIN 002, the Contractor would be responsible for developing an approved Community Relations Plan (CRP). This effort shall be coordinated with Fort Bliss, the US Army Environmental Command, and the COR.

All public notices, handouts, etc. shall be printed in both English and Spanish (Mexican Dialect).

#### 6.4.14 Communications

The Contractor shall not make available or publicly disclose any data or report generated under this contract unless specifically authorized by the COR. If any person or entity requests information from the Contractor about the subject of this performance work statement or work being conducted hereunder, the Contractor shall refer them to the COR. All reports and other information generated under this performance work statement shall become the property of the Government, and distribution to any other source by the Contractor is prohibited unless authorized by the COR.

#### 6.4.15 Deliverable Requirements

All documents must be produced with at least draft, draft-final, and final versions. The Army, through the COR, will receive initial draft documents and will provide comments to the Contractor within thirty (30) calendar days. Once initial comments are addressed, the Army will

review draft final documents before submission to appropriate regulatory agencies. The Contractor shall ensure that review periods are consistent with the applicable regulatory drivers noted in Section 1.0 of this PWS. All documents shall be identified as draft until completion of stakeholder coordination, when they will be signed and finalized. One copy of the final document shall be placed in both the project repository and Administrative Record (for CERCLA documents).

The Contractor shall follow the substantive requirements for all subject areas of the USAEC and USACE guidance applicable to deliverables required for achievement of performance objectives identified in this PWS. If versions of Engineer Manuals, Data Item Description (DID), etc. are updated, the substantive requirements of the most recently approved version will apply to this PWS. The requirements can be found at [http://www.hnd.usace.army.mil/oew/CX\\_mission.aspx](http://www.hnd.usace.army.mil/oew/CX_mission.aspx).

In addition, the Munitions Response Site Prioritization Protocol (MRSPP) requirements in 32 CFR Section 179 require the DoD in consultation with representatives of the states and Indian tribes, to assign each MRS a relative priority for response actions. These MRSPP scores must be reviewed annually and must be revised whenever new data are obtained. Pursuant to this requirement, the Contractor shall annually review, revise MRSPP scores based on new information, and submit to the Army. In addition, the Contractor shall also include any information that may have influenced the MRS priority or MRS sequencing decision in the Administrative Record and the Information Repository. Furthermore, the FY02 Defense Authorization Act creating the MMRP requires DoD to develop and maintain an inventory of defense sites that are known or suspected to contain UXO, DMM or MC. Pursuant to this requirement, the Contractor shall submit annual updates to the Installation Munitions Response (MR) map that reflect changes to the location, boundaries and/or extent of the MMRP sites in .pdf format. Note that the two annual deliverables described above will not be accepted as interim payment milestones.

The Contractor shall propose deliverables and payment milestones as part of its proposal, and if approved by the Army, included as part of the PMPs. Final decisions regarding the adequacy of milestone and deliverable completion resides with the Fort Bliss, USAEC, and the COR (see Section 4.3, Milestone Presentations) and will be based on the appropriate acceptance and approval of required documentation by Regulatory Agencies, consistent with CERCLA and the NCP.

#### 6.4.15.1. Data Reporting Requirements and Hard Copy Deliverables

The Contractor shall provide data reporting elements for definitive data per Section I.13.4.2 of EM 200-1-3. The laboratory shall report all analytical results greater than the Method Detection Limit (MDL), which, in the analyst's professional judgment, are believed to be reliably detected. Concentrations reported between the MDL and the Method Quantization Limit (MQL)/Reporting Limit (RL) shall be flagged as estimated. RLs shall be at least 3 times MDLs for all analytes

The data shall be assembled in a package so that USEPA could validate the data in accordance with USEPA requirements. The data packages shall be submitted as part of the RI Report. There should be, at a minimum, two types of data tables. The first shall include all analytical results for

all samples collected (i.e., this table shall include concentration, MDL, RL, laboratory and data validation qualifiers). The second shall include all analytical results greater than MDL (Hits Table showing concentration, RL, laboratory and data validation qualifiers) for all samples collected. Tables should be sorted by method and include appropriate data flags resulting from laboratory review and from Contractor's data validation.

In addition, the full final data packages shall be supplied by the laboratory in .pdf format (with sections bookmarked for easy searching). The final data submittals shall include documentation to match the laboratory samples with the associated field samples. Minimum reporting requirements shall be as defined in the DoD QSM. The final pdf data reports must contain full calibrations. The complete .pdf files shall be included with the Final RI Report (on CD).

#### **6.4.15.2 Electronic Data Deliverables**

All electronic data submitted by the contract laboratory is required to be error-free, and in complete agreement with the hardcopy data. Data files are to be delivered both by e-mail and on high density CD accompanying the hardcopy data reports. The disk must be submitted with a transmittal letter from the laboratory that certifies that the file is in agreement with hardcopy data reports and has been found to be free of errors using the latest version of the ADR evaluation software provided to the laboratory. The contract laboratory, at their cost, will correct any errors identified by USACE. The Contractor is responsible for the successful electronic transmission of field and laboratory data under this PWS. The Contractor's laboratory is responsible for archiving the electronic raw data and sufficient associated hardcopy data (e.g., sample login sheets and sample preparation log sheets) to completely reconstruct the analyses that were performed for a period of ten years after completion of this task order.

The laboratory results shall be submitted by the contractor in an Excel spreadsheet and the laboratory data reports shall be submitted in MS Word format. The final data package will be submitted in .pdf format.

### **7.0 Task Requirements**

#### **7.1 CLIN 001: Achieve Planning Documents**

**7.1.1 CLIN 001A, Project Kick-off Meeting.** The Contractor shall hold a Project Kick-Off meeting at Fort Bliss within 30 days of award of the task order.

**7.1.2 CLIN 001B, Project Management Plan.** The Contractor shall develop and maintain a detailed Project Management Plan (PMP) for all tasks under the PWS. The PMPs, based on the schedule prepared as part of the Contractor proposal, shall specify the schedule, management and technical approach and resources required for the planning, execution, and completion of each task's performance objectives. The first draft of the PMP shall be due within thirty (30) calendar days of contract award and shall include a payment milestone plan. The draft PMP, proposed payment milestones, and subsequent revisions shall be subject to Army review and approval through the COR. The final PMP shall be due within 30 calendar days of receipt of COR comments. A payment milestone will be established for Army approval of the final PMP through the COR.

7.1.3 CLIN 001C, Quality Assurance Surveillance Plan. Since the technical approach for this PBA shall be developed by the Contractor, the Contractor shall also develop a proposed QASP for each task for use by the Government. A Draft QASP using the template provided in Attachment 1 and incorporating the Performance Objectives and Requirements Summaries in Table A-1 of the Attachment shall be submitted with the PMP deliverables. The Final QASP will be prepared by the Government.

The QASP should highlight key quality control activities or events that the COR will use to determine how Government (COR or CO) inspections will be conducted to verify progress toward and/or completion of milestones. Activities identified in the QASP should be appropriately coded in the project schedule to allow for planning of QA inspections.

Following contract award and during project implementation, the Contractor shall develop and submit documentation of project-specific QA and QC activities prepared in accordance with the Uniform UFP-QAPP. The government will review and return the quality systems documentation, with comments, indicating acceptance or rejection. If necessary, the Contractor shall revise the documentation to address all comments and shall submit the revised documentation to the COR for acceptance. In addition, the Contractor shall develop and submit Quality Control Summary Reports to summarize the quality control details of the project.

7.1.4. CLIN 001D, Work Plan/Accident Prevention Plan/Site Safety Health Plan. The Contractor shall propose a technical approach that adequately characterizes the nature and extent of and hazards posed by MEC in the AOI North of Castner Range to achieve a regulatory approval.

The Contractor shall prepare the WP in accordance with WERS-001.01 and EM 1110-1-4009, EM 385-1-1, and EM 385-1-97. The WP shall cover all RI field activities. The Contractor must ensure that the quality of all work performed or produced under this contract meets Army approval, through the COR.

The WP shall also include a SAP for MC sampling. The Contractor shall prepare and submit for acceptance a SAP that includes a field sampling plan IAW DID WERS-009.01 and EM 200-1-3. The contractor shall describe their phased approach and addresses contaminants of interest and sample media in the SAP. The SAP shall be included under the UFP-QAPP. The Contractor shall also provide a discussion on data evaluation and fate and transport analysis. The potential for fate and transport shall address all transport pathways, and it should also address future degradation products resulting from biodegradation, photolysis, and chemical reactions. The SAP shall be submitted to TCEQ for regulatory review. It shall be inserted in the WP after it is finalized. Results of initial phase must be submitted prior to initiation of a second phase of MC sampling, if needed.

Prior to beginning any field work, the Contractor shall prepare a site specific APP/SSHP; compliant with federal, state, and local laws and regulations and approved by the COR. The Contractor shall ensure that its subcontractors, suppliers and support personnel comply with the approved APP/SSHP. The Government reserves the right to stop work under this contract for

any violations of the APP/SSHP at no additional cost to the Government. The APP/ SSHP will be written IAW all USAEC and USACE guidance.

7.1.5. CLIN 001E, Explosives Siting Plan. The Contractor is responsible for preparing the ESP for the MEC RI in accordance with all USAEC and USACE guidance and in consultation with USACE, and ensuring that USACE approval is received.

7.1.6. CLIN 001F, GIS/CSM. The Contractor shall utilize Geographical Information System (GIS) in the development of the Conceptual Site Model (CSM). The GIS will be created and managed IAW all USAEC and USACE guidance and Fort Bliss requirements (see GFI). Pre and post-project response action geospatial data analyses shall be performed using a GIS. All available existing data that is applicable to the project shall be consolidated into a geospatial database and analyzed to relay pertinent information to the Project Development Team (PDT) which may include GIS layers relating to cultural, environmental, biological, socio-economic, and/or infrastructure variables. The database shall be a living repository that is refined throughout the life of the project. The Contractor shall submit the GIS data in a format compatible to the ESRI (ArcView/ArcInfo) system, version 9.x. The contractor shall incorporate layers that overlay on maps of the site that identify physical, cultural, biological and ordnance related items found during the investigation. Examples include: real estate parcel boundaries, streets, highways, flora, fauna, and other sensitive habitats, MEC positively identified, positively identified archeological sites, environmental samples, and community structures. The contractor shall provide all submittals in the Universal Transverse Mercator (UTM) coordinate system. Known or discovered archeological site location(s) will not be released to the public without written permission from USACE. The contractor shall submit GIS files to USACE Tulsa prior to the first TPP meeting and make periodic updates. This submission may be by CD/DVD or ftp site. The Contractor shall coordinate with USACE Tulsa for this submission.

7.1.7. CLIN 001G, Historical Records Search. The Contractor will conduct a historical records search of the residential area in the southern portion of the AOI to determine if any MEC or related items were discovered/reported in that area. Records may include police records, county sheriff records, data on imported fill material, or any available construction records. The Contractor shall write a report summarizing the findings.

7.1.8. Rights-of-Entries. USACE shall obtain rights-of-entry (ROE) access required to complete the remedial investigation. The AOI North of Castner Range has only two landowners; the State of Texas and the City of El Paso.

## 7.2 CLIN 002: Achieve Community Relations Support

7.2.1. CLIN 002A, Community Relations Plan. The Contractor is responsible for developing an approved Community Relations Plan (CRP) for the project in coordination with the COR. All public participation coordination shall be approved by the Government through the COR. The CRP shall take into consideration the landowners in the residential areas adjacent to the North of Castner Range AOI.

7.2.2. CLIN 002B, Public Meetings. The Contractor shall conduct two public meetings. All public meetings will be held in the El Paso area. The support shall include, but is not limited to: preparation and delivery of briefings, graphics, maps, posters, support of question and answer sessions, and attendance and support to the Government at the public meetings. The actions are independent of the field activities that involve interaction with the community. The contractor shall submit a short summary, within 7 days after each public meeting, of the results of the public meeting. This submittal may be electronically by email.

7.2.3. CLIN 002C, Presentation of Projects. The Contractor shall plan to hold 4 presentations of the project's progress at Fort Bliss to Fort Bliss, AEC, and USACE personnel.

7.2.4. CLIN 002D, Technical Project Planning (TPP) Meetings. The Contractor shall plan on holding 3 TPP meetings at Fort Bliss for the government, TCEQ personnel, and affected landowners.

7.2.5 CLIN 002E, Restoration Advisory Board (RAB) Meetings. The Contractor shall plan to present at three RAB meetings to be held in the El Paso area.

### 7.3 CLIN 003: Achieve Remedial Investigation

The contractor will propose an MEC Hazard Assessment (HA) approach that adequately characterizes the nature and extent of and hazards posed by MEC for the purpose of developing and evaluating effective remedial alternatives and perform all necessary field activities to meet the objective of this task order. This task shall include all field activities necessary to execute this task including geophysical survey. All work under section 7.3 of this PWS will be performed in accordance with the following general requirements.

Personnel involved in munitions response activities will, as required, meet the qualifications set forth in USAEC and USACE guidance including, but not limited to Department of Defense Explosives Safety Board (DDESB), Technical Paper (TP) 18 – Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and UXO-Qualified Personnel. The Contractor must provide Personnel Qualification Certification Letters IAW DID WERS MR-09-012. Due to the inherent hazards associated with munitions response activities, personnel performing munitions response activities that present an explosive risk shall be subject to work hour limitations, unless specifically authorized by the COR. Accordingly, MEC personnel working on explosive operations for the Contractor shall be limited to a 50-hour workweek for actual MEC field operations with no individual workday exceeding 10-hours total unless otherwise authorized by the COR. This work restriction only applies to the MEC personnel performing actual MEC field work.

7.3.1. CLIN 003A, Field Kick-Off Meeting. The Contractor shall hold a field kick-off meeting at the beginning of field activities for all field personnel at Fort Bliss. This kick-off meeting will include a safety briefing and a summary of expected activities.

7.3.2. CLIN 003B, Mobilization/Demobilization. The Contractor shall mobilize resources to begin field work. After completion of field work, the Contractor shall demobilize all resources.

7.3.3. CLIN 003C, Location Surveys and Mapping. The Contractor shall perform civil surveys IAW all USAEC and USACE guidance. All data submitted shall be in the UTM coordinate system.

7.3.4. CLIN 003D, Geophysical Survey. Based on the Data Quality Objectives (DQOs) developed during the TPP process, the Contractor shall perform the Geophysical surveys in accordance with Interim Guidance Document IGD 14-01 which provides EM 200-1-15 for immediate use and interim guidance from ESTCP, DID WERS-004.01, and the accepted work plan (or QAPP) to include a Geophysical Investigation Plan (GIP). The contractor shall employ the Geophysical Systems Verification (GSV) concept in accordance with “*A Physics-Based Alternative to Geophysical Prove outs for Munitions Response, Environmental Security Technology Certification Program (ESTCP), July 2009*” and install an Instrument Verifications Strip (IVS) using anomaly avoidance techniques, test their system(s) and write an IVS Report for review by the Army. An IVS Memorandum will be received by the USACE within one week of the IVS’s installation and equipment verification for review by the USACE Geophysics personnel. Any DGM Data Collection prior to USACE’s acceptance of the memo will be at contractor’s risk. All data will be included with the submittal of the IVS Memorandum for review by the USACE. As part of the GSV, the contractor shall also install blind seeds. The Contractor shall keep all knowledge of quality control seeds blind from the data collection and processing teams. The Contractor shall submit for review and acceptance the blind seed firewall plan.. This task shall include all components required for completion of the geophysics such as brush clearing, licensed professional surveying of transects, grids, and seed items, etc.

7.3.5. CLIN 003E, MEC Characterization/Identification. Demonstrate that all areas with potential to contain MEC will have been traversed at the completion of fieldwork and that there is a 95% chance of detecting these areas. Demonstrate with at least 95% confidence that areas classified as MEC-contaminated have greater than or equal to 0.1 UXO per acre for residential use areas. Demonstrate that the boundaries of all identified MEC contaminated areas have been delineated to an accuracy of at least +/- half of the transect spacing maximum, **which is** 250 feet, and demonstrate that a 95% confidence has been achieved for bounding the potential depth of MEC. Demonstrate 95% confidence in the nature (type and density) of MEC and MEC related debris, for each relatively homogenous MEC contaminated area, has been achieved. Demonstrate that data inputs from the RI into the FS will enable remediation cost estimates with an accuracy of +50 percent/-30 percent. The work and reporting shall address the surface and sub-surface metallic anomaly density distribution (anomaly/acre) across identified MEC contaminated areas and other remediation cost drivers such as vegetation type and density, terrain conditions, soil type, exclusion zone evacuation costs, etc. each to a level of accuracy within the range specified herein.

All geophysics work shall be conducted in accordance with the geophysics DID. For this task order, one acre of transects equals 14,520 lf (2.75 miles) of transects 3 feet wide. One acre worth of grids equals seventeen 2500 SF grids or four 10,000 sf grids.

7.3.5.1. MEC Disposal and Accountability. The Contractor shall maintain a detailed accounting of all MEC items/components encountered. This accounting shall include the

amounts of MEC, nomenclature and condition, location and depth of MEC, and disposition. The accounting system shall also account for all demolition materials utilized to detonate MEC on site. The Contractor shall take digital photographs of identifiable MEC found during the investigation.

All munitions debris (MD) will be inspected, certified, and disposed of in accordance with all USAEC and USACE guidance including, but not limited to EM 385-1-97.B. MD inspection will be certified on DD Form 1348-1 as follows: "This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, is inert and/or free of explosive or related materials". This certification requires dual signatures. Both the Senior Unexploded Ordnance Specialist (SUXOS) and the Unexploded Ordnance Safety Officer/Unexploded Ordnance Quality Control Specialist (UXOSO/UXOQCS) will sign as certifiers, and the on-site USACE OE Safety Specialist (OESS) will sign as verifier (if available). The inspected and certified material will be containerized, maintained, and then safeguarded until proper disposal is arranged and accomplished.

All MPPEH and other metallic debris will be twice-inspected and certified as presenting no explosive hazards by Contractor UXO qualified personnel prior to being removed from the grid. Once inspected and certified as presenting no explosive hazard, material determined as safe (MDAS) will be reclassified as munitions debris, range related debris or other debris and will be containerized in an on-site storage container and safeguarded until proper disposition can be arranged. The storage container will be locked at all times when not in use. Munitions debris will be segregated from other metallic debris. All munitions debris shall be disposed of at a foundry and/or recycler where it will be processed through a smelter, shredder or furnace prior to resale or release in accordance with all governing regulations. Munitions debris is to be disposed of permanently. The Contractor shall document transport of munitions debris to the next responsible party ensuring no loss of chain of custody, and must provide certification of destruction as part of the RI Report.

The Contractor shall be responsible for the destruction of all MEC encountered during project activities. The Contractor shall be responsible for destruction/disposition of all MEC/MMPEH (Material Potentially Presenting an Explosives Hazard) encountered during the project; in coordination with the USACE OESS. The Contractor shall establish the method of destruction/disposition in the project QAPP consistent with the approved ESP. During intrusive activities and disposal operations, the Contractor shall be responsible for the use of engineering controls, as needed, and coordinate with the USACE OE Safety Specialist in the event that evacuation of local residents located within the calculated Minimum Separation Distances (MSDs) is required. Sandbag mitigation may be used as engineering controls to reduce the intentional detonation MSD on MEC items authorized for the sandbag mitigation procedure. These controls will be used in accordance with HNC-ED-CS-98-7, HNC Safety Advisory dated 7 November 2011, and DDESB Memo dated 29 November 2010 (Clarification regarding the use of sandbags for mitigation of fragmentation and blast effects due to intentional detonation of munitions). Tamping (single or multiple items) may be used in accordance with DDESB Technical Paper 16 and the Buried Explosion Module Version 6.3.2. These documents will be available on site for mitigation methods used.

7.3.5.2. Backfilling Excavations. All access/excavation/detonation holes shall be backfilled by the Contractor. The Contractor shall restore such areas to their prior conditions. If a Blow-In-Place (BIP) occurs, post-detonation sampling for explosives residue is required prior to backfill.

7.3.6. CLIN 003F, Munitions Constituents (MC) Sampling. The objective of the MC sampling is to determine the presence of and the nature and extent of the MCs that are detected above the applicable regulatory criteria and to perform a human health risk assessment as well as an ecological risk assessment, if appropriate, in accordance with the EPA Risk Assessment Guidance (RAGS) and USACE EM 200-1-4, Volumes I and II. Sampling shall be conducted to support the MC baseline risk assessment. The Contractor shall propose the sampling approach, quantities, and analytical methodology, including QC requirements. Please note that for sampling and analysis of explosives and propellants, EPA SW-846 method 8330B with the multi-increment composite sampling approach will be utilized for all soil matrices.

7.3.6.1. Deviations. Any deviations from the accepted SAP shall be documented in the Data Quality Control Reports (DQCRs). Any deviations that may affect DQO's shall be conveyed to the USACE COR immediately. Specifics of the environmental sampling program shall be determined at the TPP meeting.

7.3.6.2. Laboratory Qualifications. Environmental laboratory services are to be provided only by laboratories compliant with the most recently published version of the DoD QSM and holding a current DELAP accreditation for all appropriate fields-of-testing.

As requested by the COR, the laboratory shall submit, in a timely manner, the self-declaration forms (including required supporting documentation), as well as information related to the laboratories current DELAP accreditation. Before testing services can be performed by the laboratory, the COR will notify the candidate laboratory of the acceptability of the declaration and supporting documentation.

Self-declaration and provision of DELAP accreditation information is to be provided annually while supporting USACE, Tulsa contracts.

In addition to DELAP certification the laboratory shall hold current certification for all appropriate fields-of-testing in the State holding regulatory over-sight for the project. Proof of current certification for the applicable field of testing is required prior to acceptance of any samples for the project.

An environmental laboratory either anticipating, or engaged in support of USACE Tulsa contracts shall notify the prime Contractor and COR immediately of change in status of laboratory operations that may affect on-going compliance with these requirements. The COR may, at any time, conduct audits (including requests for pertinent data or information) that support an environmental laboratory's certifications and/or self-declaration of compliance with DoD QSM. If the COR finds the laboratory non-compliant, alternate compliant laboratory services will be utilized, until such time as compliance is again demonstrated.

Before performing environmental testing for USACE, Tulsa the laboratory shall have access to the approved QAPP.

7.3.6.3. Data Reporting Requirements. The Contractor shall provide data reporting elements for definitive data per Section I.13.4.2 of EM 200-1-3. The laboratory shall report all analytical results greater than the Method Detection Limit (MDL), which, in the analyst's professional judgment, are believed to be reliably detected. Concentrations reported between the MDL and the Method Quantization Limit (MQL)/Reporting Limit (RL) shall be flagged as estimated. RLs shall be at least 3 times MDLs for all analytes.

7.3.6.4. Hardcopy Data Deliverables. The data shall be assembled in a package so that USEPA could validate the data in accordance with USEPA requirements. The data packages shall be submitted as part of the RI Report. There should be, at a minimum, two types of data tables. The first shall include all analytical results for all samples collected (i.e., this table will include concentration, MDL, RL, laboratory and data validation qualifiers). The second shall include all analytical results greater than MDL (Hits Table showing concentration, RL, laboratory and data validation qualifiers) for all samples collected. Tables should be sorted by method and include appropriate data flags resulting from laboratory review and from Contractor's data validation.

**In addition, the full final data packages shall be supplied by the laboratory in .pdf format (with sections bookmarked for easy searching). The final data submittals shall include documentation to match the laboratory samples with the associated field samples. Minimum reporting requirements shall be as defined in the DoD QSM, version 3, January 2006, section 5.10. The final pdf data reports must contain full calibrations. The complete .pdf files shall be included with the Final RI Report (on CD).**

7.3.6.5. Electronic Data Deliverables. All electronic data submitted by the contract laboratory shall be error-free, and in complete agreement with the hardcopy data. Data files are to be delivered both by e-mail and on high density CD accompanying the hardcopy data reports. The disk must be submitted with a transmittal letter from the laboratory that certifies that the file is in agreement with hardcopy data reports and has been found to be free of errors using the latest version of the ADR evaluation software provided to the laboratory. The contract laboratory, at their cost, shall correct any errors identified by the Government. The Contractor shall be responsible for the successful electronic transmission of field and laboratory data under this PWS. The Contractor's laboratory shall be responsible for archiving the electronic raw data and sufficient associated hardcopy data (e.g., sample login sheets and sample preparation log sheets) to completely reconstruct the analyses that were performed for a period of ten years after completion of this task order.

The laboratory results shall be submitted by the Contractor in an Excel spreadsheet and the laboratory data reports shall be submitted in MS Word format. The final data package shall be submitted in .pdf format.

7.3.6.6. Data Validation. The Contractor shall conduct data validation as specified in the U.S. EPA Protocols. The data validation process shall be conducted according to the method specific SOPs, project specific QAP, DoD QSMs and be validated and qualified using the U.S. EPA National Functional guidelines, as appropriate. The validation shall be performed as required in accordance with the approved SAP and documented in the RI Report. The document of data validation documentation should address review of the results and data qualifiers of laboratory/field QC and primary field samples.

7.3.6.7. Data Quality. The Contractor shall provide data quality of a level sufficient for the support of project objectives as specified in the approved SAP. The Contractor shall provide QC of the various analytical tasks performed. The Contractor shall achieve the data quality specified in the approved SAP. Analytical data that does not meet QA requirements may be rejected by the Government; to be corrected at the Contractor's expense.

7.3.7. CLIN 3G, RI Report. The Contractor shall provide a RI Report for the investigation IAW EP 1110-1-18, EM CX Interim Guidance 06-04 and FINAL United States Army Military Munitions Response Program RI/FS Guidance dated November 2009.

7.4 CLIN 004: Achieve Feasibility Study. The Contractor shall provide a FS Report for the investigation IAW all USAEC and USACE guidance.

7.5 CLIN 005: Achieve Approved Proposed Plan. The Contractor shall prepare and submit an approved Proposed Plan in accordance with all USAEC and USACE guidance.

7.6 CLIN 006: Achieve Approved Decision Document. The Contractor shall prepare and submit an approved Decision Document in accordance with all USAEC and USACE guidance.

7.7 CLIN 007: Achieve Administrative Record.

The Contractor shall establish and maintain the Administrative Record, located at Fort Bliss, for the on-going project in accordance with all USAEC and USACE guidance. The Contractor shall update and maintain the Administrative Record for the on-going project in accordance with the guidance given in EP 1110-3-8, Chapter 4 (Establishing and Maintaining Administrative Records). This task requires close coordination with the Corps of Engineers Tulsa District (CESWT) to secure all required documents to support the Administrative Record. The Contractor shall provide all final documents in the Administrative Record on CD/DVD to CESWT. These files will be suitable for placement on the PIRS web site. The Contractor shall submit 2 copies to CESWT.

7.8 CLIN 008: Achieve Fencing and Signage for Archeology and Border Patrol Museums Area

The Contractor will support the required land use control measure for the area containing the Archeology Museum and the Border Patrol Museum on the Closed Castner Range with installation of fencing and signage (see Attachment F for Figures). An initial boundary survey needs to be conducted by the Contractor so that the fencing/signage is placed upon Fort Bliss

(Closed Castner Range) property. The perimeter is approximately 3400 linear feet and be of three-strand, 12.5 gauge, smooth wire fence. The wire fence will be installed with line posts on 100-foot centers. Each corner will have corner posts. The contractor will update the attached survey plat with a survey of the new fence boundary when complete. Each pair of signs will be posted around the perimeter of the closed landfill in English and Spanish.

Signs will be posted at 200 foot intervals along the fence line. The signs will be 3 feet by 2.5 feet mounted on two 8 foot posts which are secured with concrete at the base. The signs will be constructed of a quality that will withstand the sun and mounted in such a way as to withstand the wind and use letters at least 2 inches tall. The Contractor will provide a letter report and survey to USACE and Fort Bliss when the fence and signs are installed and ready for inspection. The Contractor will confirm the Spanish sign correctly reflects the information on the English sign. The Contractor will need to provide UXO avoidance support during installation of the fencing/signage.

## 8.0 Additional Requirements

### 8.1 Resources

#### 8.1.1 Army Furnished Resources

The Army, through the COR, shall make available the following resources to the Contractor:

- Records, reports, data, analyses, and information, in their current format (e.g., paper copy, electronic, tape, disks, CDs), to facilitate development of an accurate assessment of current, former, and historical site activities and operations; waste generation and contaminant characteristics; parameters of interest; and site environmental conditions.
- Access to personnel to conduct interviews on site operations and activities.
- Access to DoD and Army policy and guidance documents.
- All Army owned property used for investigation purposes must be maintained by the Contractor in accordance with applicable maintenance requirements, and may not be replaced by the Army should new equipment be required.

Information pertaining to the sites, regulatory status, etc. supplied in the PWS and as Government Furnished Information (GFI) is intended to assist the offerors in developing proposals. However, the proposing contractor(s) bear the full burden to perform whatever due diligence they deem prudent to examine records, documents, and etc. necessary to develop a proposal including independent verification of the information in the PWS and in any provided GFI. A reasonable effort (at the time of the Request for Proposal) has been made to supply all relevant information for the use of the offerors.

#### 8.1.2 Contractor Furnished Resources

The Contractor must possess all the required expertise, knowledge, equipment and tools required to meet or exceed the Army's objectives identified in this PWS in accordance with established industry standards.

In addition, the Contractor shall be responsible for the following:

- The provision and cost of the utilities associated with implementation of investigative activities, including installation of individual meters for necessary utilities.
- All waste generated under this contract shall be the responsibility of the Contractor.
- Any other necessary resources needed to achieve the performance objectives.

## 8.2 Certification and Approval of Project Milestones and Deliverables

The COR will be responsible for contract management, inspection, oversight, review, and approval activities. Certification and approval of project milestones by the COR is necessary before distribution of payments. Final acceptance of milestone completion shall include appropriate acceptance of site investigation documentation by regulators.

Certification and approval of project milestones by the Army is contingent upon the Contractor performing in accordance with the terms and conditions of the contract, this PWS, and all amendments.

As required by the COR, representatives of USAEC, the Installation and the Contractor shall meet in person or via conference call with the COR or his designated representative at a date and time designated by the COR after receipt of each status report to:

- Formally review the quantity and quality of services;
- Inspect work for compliance with this PWS, the associated Contractor's final proposal, and project documentation;
- Accept or reject milestones and deliverables completed since the previous review; and
- Prepare, approve and submit DD Form 250 "Material Inspection and Receiving Report" or equivalent for milestone payments in accordance with milestone completions and approvals at the COR level.

## 8.3 Government Rights

The Army has unlimited rights to all documents/material produced under this contract. All documents and materials, to include the source codes of any software, produced under this contract shall be Army owned and are the property of the Army with all rights and privileges of ownership/copyright belonging exclusively to the Army. These documents and materials cannot be used or sold by the Contractor without written permission from the KO. All materials supplied to the Army shall be the sole property of the Army and cannot be used for any other purpose. This right does not abrogate any other Army rights under the applicable Data Rights clause(s).

## 8.4 Stop Work

The Contractor, authorized Installation personnel, authorized site personnel, and the COR have the responsibility to stop work immediately if the work is considered to be a serious threat to the safety or health of workers, other personnel, or to the environment. Authorized Installation personnel include Fort Bliss safety officers, Environmental Division personnel, and command personnel with responsibility for overall operations. When work is stopped due to a hazard/threat to worker safety, health, or the environment, the situation and resolution must be documented and submitted to the KO. Work must be stopped whenever chemical and biological warfare agents are encountered.

## 8.5 Environmental Responsibility Considerations

- The Army will retain responsibility for any assessed natural resource damages that are attributed to historic releases of hazardous substances (prior to contract with the Contractor) and any injuries that are necessary and incidental to the reasonable implementation of a selected response or remedial action. The Contractor shall be responsible for any/all additional natural resource injuries and associated Natural Resource Damages claims brought as a result of its actions (e.g. release of hazardous substance or unreasonable disturbance of natural resources as a result of construction activities).
- The Army will retain all responsibility for third party liability for CWM or radiological material that are either targeted for or may be discovered during the course of investigation.
- Response cost claims, property damage and personal injury claims brought due to contamination and hazardous substance releases that have occurred historically (prior to contract with the Contractor) and are not due to Contractor investigation activities are excluded from Contractor responsibility. The Contractor shall be responsible for and indemnify the Army for:
  - Any response cost claims for any environmental remediation services which the Contractor has assumed responsibility for under this PWS;
  - All costs associated with correction of a failure of any remedy implemented or operated and maintained by the Contractor to the extent such failure was caused by the willful or negligent acts or omissions of the Contractor in the course of performing the environmental services;
  - All personal injury or property damage claims to the extent caused by the acts or omissions of the Contractor in the course of performing the environmental services;
  - All natural resource damages pursuant to 42 U.S.C. Section 9607(a)(4)(C), to the extent that such damages were caused or contributed to by the actions of the Contractor or its successors in interest; and
  - All costs associated with or arising from any negligent acts or omissions or willful misconduct of the Contractor in the course of performing the environmental services or implementing remedial actions.

## 8.6 Inspections

The Army technical experts will independently review Contractor work to ensure compliance with all applicable requirements. Any service or submittal performed that does not meet contract requirements shall be corrected or re-performed by the Contractor and at no additional cost to the Government. Corrective action must be certified and approved by the COR consistent with the basic contract. If the Contractor performs any task unsatisfactorily and all defects are not corrected, the Government reserves the right to terminate the contract for default. In addition, the Government reserves its rights under the FAR clause 52.246-4, "Inspection of Services – Fixed Price", for further remedies concerning a Contractor's failure to perform in conformance with contract requirements.

## 8.7 Organizational Conflicts of Interest

8.7.1 Disclosure. The Contractor shall provide a disclosure statement with its proposal, which concisely describes all relevant facts concerning any past or present organizational conflicts of interest relating to the work in this PWS. In the same statement, the Contractor shall provide the information required in the following paragraph to assure the Government that the conflicts of interest have been mitigated and/or neutralized to the maximum extent possible. If a conflict of interest is discovered after contract award, the Contracting Officer will make a decision whether to terminate or rescind the PWS and/or contract at that time.

8.7.2 Potential Conflicts of Interest. This request for proposals is open to the Huntsville District WERS Contract small businesses only. In order to avoid any organizational conflicts of interest, or even the appearance of any organizational conflicts of interest, any contractor performing environmental services work at the installation under this contract will need to avoid, neutralize and/or mitigate - prior to contract award - significant potential conflicts of interest that may prejudice effective competition. The KO has determined that at a minimum contractors currently performing work on this installation must ensure that all data pertaining to contamination at the sites compiled by or in the possession of such contractors shall be made available to all potential contractors in a timely fashion to the maximum extent possible by providing such data in to a data repository.

## 8.8 Access and Security

No access to the Fort Bliss installation is expected, but in order to ensure the security and orderly running of the installation, any contractor personnel who require access shall follow procedures established by the Installation. Fort Bliss is an active facility with operational and security requirements for various activities. The Contractor may be subject to these limitations relative to coordination of activities, schedule, training and access, and will be responsible for all costs associated with complying with any limitations. The Contractor should account for potential delays due to DoD security requirements in its pricing.

## 8.9 Travel

Travel to/from the AOI North of Castner Range to other CONUS locations for such purposes as to attend meetings, briefings and/or presentations may be required incidental to this requirement, the costs for which shall be included in the total price for the PWS.

#### 8.10 Performance and Payment Bonds

In accordance with the base contract, the Contractor:

☒ is NOT required to furnish Performance and Payment Bonds on this PWS.

☐ is required to furnish Performance and Payment Bonds on this PWS in accordance with the following:

#### 9.0 Milestone Payment Requests (Invoices)

Invoices, with corresponding documentation attached, shall be submitted to the USACE Tulsa District Air Force/IIS Section upon completion of one or more performance milestones to:

Tulsa District, Corps of Engineers  
Attn: (b) (6) (CESWF-PEC-EE)  
1645 S. 101<sup>st</sup> East Avenue  
Tulsa, OK 74128-4609  
(b) (6)

Tulsa District, Corps of Engineers  
ATTN: CESWF-PEC-EE  
1645 S. 101<sup>st</sup> East Avenue  
Tulsa, OK 74128-4609  
Phone No.:  
Fax No.: (b) (6)

#### 10.0 Government Points of Contact

Contracting Specialist:

(b) (6)  
Tulsa District Corps of Engineers  
CESWT-CT  
1645 S 101 E Ave  
Tulsa, OK 74128-4609

USACE Project Manager:

Fort Worth District Corps of Engineers  
MIE Branch

1645 S 101 E Ave  
Tulsa, OK 74128-4609

[REDACTED]

Technical Manager:

[REDACTED]

Fort Worth District Corps of Engineers  
MIE Branch  
1645 S 101 E Ave  
Tulsa, OK 74128-4609

(b) (6)  
[REDACTED]

Ordnance and Explosive Safety Specialist:

[REDACTED]

Regional Planning and Environmental Center  
Fort Worth District  
819 Taylor Street  
Fort Worth, Texas 76102

(b) (6)  
[REDACTED]

Army Environmental Command

[REDACTED]

US Army Environmental Command-Midwest  
Division  
Environmental Service Support Manager  
2450 Connell Rd, Bldg 2264  
Fort Sam Houston, TX 78234-2686

(b) (6)  
[REDACTED]

Ft. Bliss POC

[REDACTED]

Directorate of Public Works  
Environmental Division  
ATTN: IMWE-BLS-PWE  
Bldg 622, Taylor Road  
Ft. Bliss, TX 79916

(b) (6)  
[REDACTED]

All written correspondence pertaining to this Performance Work Statement should be addressed to the contract specialist unless otherwise directed by the KO. Written directions or clarifications to this Performance Work Statement may only be given to the contractor by the KO or contract

specialist. A change in Government Points of Contact during the period of performance for task order execution does not constitute a change to the PWS.

## Attachment A: Reference Documents

The Army believes that documentation provided with the solicitation represents the most recent and appropriate documentation available for the Installation and sites identified in this contract. However, if there is a conflict between this information and other site documentation (the existing reports), the Contractor is solely responsible for reviewing all available information and forming their independent, professional conclusions/interpretation of site conditions and requirements to meet the objectives of this contract. This information is not intended as a substitute for complete analysis of technical data available, nor is it intended to be a guide on how the Contractor should address achievement of the performance objectives/standards.

Specific documents may be made available following a request to the Contracting Officer, if the documentation can be distributed in a timely manner. Electronic format is not guaranteed.

Table 4: Available Reference Documents.

Title	Author	Date
Final MEC Reconnaissance Survey Report	USACE-Huntsville District	June 2015
Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Fort Bliss Projects	Fort Bliss	

## **Attach B: LIST OF ACRONYMS**

APP	Accident Prevention Plan
BIP	Blow-In-Place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESWT	Corps of Engineers Tulsa District
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
CRP	Community Relations Plan
CSM	Conceptual Site Model
CWM	Chemical Warfare Materiel
DA	Department of the Army
DD	Decision Document
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DMM	Discarded Military Munitions
DoD	Department of Defense
DQO	Data Quality Objectives
ELAP	Environmental Laboratory Accreditation Program
EO	Executive Order
ERS	Environmental Remediation Contract
ESP	Explosive Site Plan
FAR	Federal Acquisition Regulation
FS	Feasibility Study
GFI	Government Furnished Information
GIS	Geographic Information System
HA	Hazard Assessment
HosA	Hospitality Area
IAW	In Accordance With
JTR	Joint Travel regulations
KO	Contracting Officer
MC	Munitions Constituents
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MQL	Method Quantitation Limit
MRA	Munitions Response Area
MRS	Munitions Response Sites
MSD	Minimum Separation Distance
NCP	National Oil and Hazardous Substances Contingency Plan
NFA	No Further Action
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PBA	Performance-Based Acquisition
PDT	Project Development Team
PIP	Public Involvement Plan
PMP	Project Management Plan
PP	Proposed Plan
PWS	Performance Work Statement
QA	Quality Assurance
QASP	Quality Assurance Surveillance Plan
QC	Quality Control

QSM	Quality Systems Manual
RAGS	Risk Assessment Guidance
RI	Remedial Investigation
RL	Reporting Limit
ROE	Right of Entry
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Specialist
TCEQ	Texas Commission on Environmental Quality
TO	Task Order
TPP	Technical Project Planning
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
WP	Work Plan

## **Attachment C: List of Definitions**

*Activity-Based Schedule:* Activities and milestones defined at the detail level and logically sequenced to support, and manage completion of the performance objectives.

*Contractor's Project Costs:* Costs incurred by the Contractor (including costs covered by insurance and the PMP) in executing the work required to achieve the performance objectives identified in the PWS for all sites identified in this contract/task order.

*Chemical Warfare Materiel (CWM):* An item configured as a munitions containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM also includes V- and G- services nerve agent, H-series blister agent, and lewisite in other than munitions configurations. Due to their hazards, prevalence, and military-unique application, Chemical Agent Identification Sets (CAIS) are also considered CWM. CWM does not include riot control agency, chemical herbicides, smoke and flame producing items, or soil, water, debris, or other media contaminated with chemical agent.

*Deliverables:* Documentation or data that support the completion of milestones or achievement of the performance objectives identified in this PWS.

*Discarded Military Munitions (DMM)* – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.

*Explosive Ordnance Disposal (EOD)* – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance. It may also include explosive ordnance that has become hazardous by damage or deterioration.

*Long-Term Management (LTM):* The remedial phase including maintenance, monitoring, record keeping, remedy reviews, etc. initiated after response (removal or remedial) objectives have been met (i.e., after Response Complete). LTM includes development and implementation of an exit or ramp-down strategy for LTM activities at each site.

*Milestones:* Significant events or activities that occur in the course of the Contractor achieving the performance objectives identified in this PWS.

*Military Munitions (MM):* All ammunition products and components produced or used by or for the DoD or the U.S. Armed Services for national defense and security, including MM under the control of the DoD, the U.S. Coast Guard, the U.S. Department of Energy, and National Guard personnel. The term military munitions includes: confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DoD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. MM do not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components thereof. However, the term does include non-nuclear components of nuclear devices, managed under DOE's nuclear weapons program, after all required sanitization operations under the Atomic Energy Act of 1954, as amended, have been completed.

*Munitions Constituents (MC):* Any materials originating from unexploded ordnance, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

*Munitions Debris (MD):* Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

*Munitions and Explosives of Concern (MEC):* This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means UXO, as defined in 10 USC 101(e)(5)(A) through (C); DMM, as defined in 10 USC 2710(e)(2); or MC (e.g., TNT, RDX), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

*Munitions response:* A response action, including investigation, removal actions, and remedial actions, to address the explosives safety, human health, and/or environmental risks presented by munitions and explosives of concern (MEC) and/or MC.

*PMP Documents:* The original PMP (including project schedule), revisions, and status reports.

*Project Documents (CERCLA):* Documentation and data required by CERCLA. These documents include the additional site plans referenced in Section 6.5 of this PWS.

*Project Price:* The approved proposed price for achieving completion of services in accordance with the PWS, the payment of which will be tied to one or more project milestones. The Project Price does not include the cost of the PMP, insurance premiums or surplus line taxes, if applicable.

*Project-related information:* All previous environmental restoration documentation of a technical nature developed by the Army and previous Army contractors and subcontractors during their work at the sites specified in this PWS, and all the documentation developed by the Contractor in order to achieve the performance objectives specified in this PWS.

*Remedial Action (Operations) (RA(O)):* The remedial phase during which the remedy is in place and operating to achieve the cleanup objective identified in the Record of Decision (ROD) or other formal decision document. Any system operation (long-term operations) or monitoring (long-term monitoring) requirements during this time are considered RA(O). RA(O) includes development and implementation of an exit or ramp-down strategy for LTM activities at each site.

*Remedy In Place (RIP):* A final remedial action has been constructed and implemented and is operating as planned in the remedial design. An example of a remedy in place is a pump-and-treat system that is installed, is operating as designed, and will continue to operate until cleanup levels have been attained. Because operation of the remedy is ongoing, the site cannot be considered Response Complete.

*Response Complete (RC):* The remedy is in place and the required remedial action-operations (RA-O) have been completed. If there is no RA(O) phase and all response action objectives have been achieved and documented, then the remedial action-construction end date will also be the RC date.

*Site Close-Out:* Site Close-Out signifies when the Army has completed active management and monitoring at an environmental cleanup site, no additional environmental cleanup funds will be expended at the site and the Army has obtained regulator concurrence. For practical purposes, Site Close-Out occurs when cleanup goals have been achieved that allow unrestricted use of the property (i.e., no further LTM, including institutional controls, is required). Site Close-Out may include, but not be limited to, the

dismantling, removal, recycling, reclamation and/or disposal of all remedial activity systems and ancillary equipment above and underground to return the site to its natural state.

*Unexploded ordnance (UXO):* Military munitions that have been primed, fuzed, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and remain unexploded either by malfunction, design, or any other cause.

## **Attachment D: Minimum Requirements for Data Layers Without An Established Quality Assurance Plan**

- Installation geospatial data shall be provided in a personal geodatabase compliant with the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE), version 2.6
- If a geospatial data layer contains a discriminator per SDSFIE v2.6, the discriminator must be populated
- All features shall be attributed with the Installation Code from the Headquarters Installation Information System (HQIIS)
- Each data layer shall be accompanied by metadata conforming to the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM) and the Army Metadata Standard
- The FGDC National Standard for Spatial data Accuracy (NSSDA) shall be used to evaluate and report the positional accuracy of all data layers submitted
- All data shall be provided with a defined projection and must have datum WGS84
- All data shall be topologically sound and geometrically correct. This includes no null or empty features, no non-simple features and no duplicate features
- All data shall meet the basic topology rule set for installation geospatial data. Exceptions to the topology rules are possible. In case of an exception, a justification must be provided in the data layer documentation.
  - Point features
    - Must be located inside polygons of parent feature class
  - Line features
    - Must not self overlap
    - Must not self intersect
    - Must be single part
    - Must not have pseudo-nodes
    - Must not have dangles
  - Polygon features
    - Must not overlap
    - Must not have gaps

## **Attachment E: Quality Assurance and Surveillance Plan (QASP) Template**

### **1.0 Overview**

**1.1 Introduction.** This performance-based Quality Assurance Surveillance Plan (QASP) sets forth the procedures and guidance that the Contracting Officer's Representative (COR) will use in evaluating the technical performance of the Contractor in accordance with the terms and conditions of the performance work statement (PWS). A copy of the signed final QASP will be furnished to the Contractor so that the Contractor will be aware of the methods that the COR will use in evaluating performance for each task order under this contract.

**1.2 Purpose.** The QASP objective is to explain Government procedures to be used to verify that appropriate performance and quality assurance methods are used in the management of this performance-based contract. The purpose of the QASP is to assure that performance of specific activities and completion of milestones are accomplished in accordance with all requirements set forth in the PWS.

This QASP describes the mechanism for documenting noteworthy accomplishments or discrepancies for work performed by the Contractor. Information generated from COR's surveillance activities will directly feed into performance discussions with the Contractor. The intent is to ensure that the Contractor performs in accordance with performance metrics set forth in the PWS documents, the Army receives the quality of services called for in the contract, and the Army only pays for the acceptable level of services received.

The QASP details how and when the COR will monitor, evaluate, and document Contractor performance on the contract. The QASP is intended to accomplish the following:

1. Define the role and responsibilities of participating Army officials.
2. Define the key milestones/deliverables that will be assessed.
3. Define Exceptional, Very Good, Satisfactory, Marginal, and Unsatisfactory performance standards for key milestones/deliverables.
4. Describe the surveillance methodology that will be employed by the Army in assessing the Contractor's performance.
5. Describe the surveillance documentation process and provide copies of the form that the Army will use in evaluating the Contractor's performance.
6. Outline corrective action procedures.
7. Describe payment procedures.

This QASP will be revised and finalized by the COR and Contractor upon completion of the Project Management Plan (PMP) in accordance with Section 4.0, Project Management, of the PWS.

### **2.0 Roles and Responsibilities of Army Officials**

**2.1 Contracting Officer.** The Contracting Officer (KO) has overall responsibility for overseeing the Contractor's performance. The KO is responsible for the day-to-day monitoring of the Contractor's performance in the areas of contract compliance, and contract administration;

reviewing the COR's assessment of the Contractor's performance; and resolving all differences between the COR's assessment and the Contractor's assessment of performance. It is the KO that assures the Contractor receives impartial, fair, and equitable treatment under the contract. The KO is ultimately responsible for the final determination of the adequacy of the Contractor's performance. The KO is the only one authorized to obligate the Government on this contract.

**2.2 Contracting Officer's Representative (COR).** The COR is responsible for technical administration of the project and assures proper Army surveillance of the Contractor's performance. The COR is responsible for monitoring, assessing, recording, and reporting on the technical performance of the Contractor on a day-to-day basis.

**2.3 Technical Expertise and Subject Matter Experts.** The KO and COR may call upon the technical expertise of other Army officials and subject matter experts (SME) as required. These Army officials/SMEs may be called upon to review technical documents and products generated by the Contractor. Contracting Agency representatives will also conduct review of contract documentation such as invoices, monthly status reports, and work plans.

### **3.0 Key Milestones/Deliverables to be Assessed**

**3.1** At a minimum, the following milestones and associated deliverables will be evaluated in accordance with this QASP:

- Acceptance of the final PMP, QASP, and work planning documents
- Achievement of the RI as specified in the PWS
- Correction of deficiencies noted in the review(s)
- Approved interim milestones identified in the final PMP

Additionally, the Army will evaluate performance on the key quality control activities and events specified by the Contractor through their Quality Assurance (QA) strategy (see Section 4.6: Quality Management, of the PWS).

### **3.2 Performance Standards for Key Milestones/Deliverables**

Since price is fixed in the performance-based acquisitions utilized by the Army, the Contractor's performance will be evaluated by assessing the key milestones/deliverables described above according to five standards: quality, schedule, safety, management of key personnel and resources, and stakeholder concurrence. For each of these performance standards, the COR will assign one of five ratings of the Contractor's performance: exceptional, very good, satisfactory, marginal, or unsatisfactory as defined in Table 1 of the QASP. Note: These performance standards may be modified to meet the needs of the Army.

**Table 1: QASP Performance Standards and Ratings Definitions**

Performance Standard	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Basic Definition	Contractor exceeds the performance requirements for the milestone, deliverable, or standard, with no substantive input from the government.	Contractor exceeds the performance requirements for the milestone, deliverable, or standard, with minimal input from the government.	Contractor meets the performance requirements for the milestone, deliverable, or standard, with moderate input from the government.	Contractor meets the performance requirements for the milestone, deliverable, or standard, with significant input from the government.	Contractor does not meet the performance requirements for the milestone, deliverable, or standard, after significant input from the government.
<b>Performance Category: Quality of Product or Service</b>					
<b>Quality</b>	<p>Draft Final and Final deliverables are of excellent quality, approved as submitted, or with no substantive comments limited to grammar, spelling, or terminology.</p> <p>Army audit finds that the data collected and/or the work performed exceeds the requirement of the PWS. No deficiencies noted.</p>	<p>Draft Final deliverables are of high quality and comments are mostly minor. Final deliverables are approved after one (1) round of Army comments on the Draft Final through acceptance of response to comments table and back check of Final report against original comments. No further revisions are required.</p> <p>Army audit of work does not identify any deficiencies that compromise the quality of the data collected or work performed.</p>	<p>Draft Final deliverables are of acceptable quality with only a few numbers of comments identifying major weaknesses. Final deliverables are approved after two (2) rounds of Army comments on Draft Final. No further revisions are required.</p> <p>Army audit of work identifies deficiencies that do not compromise the quality of the data collected or work performed, and can be corrected.</p>	<p>Draft Final deliverables are of poor quality with a significant number of comments identifying major weaknesses or deficiencies. Final deliverables require more than two (2) rounds of Army comments on Draft Final before being approved. (e.g., changes are required to the Final document due to inadequate incorporation of comments).</p> <p>Army audit of work identifies deficiencies that compromise the quality of the data collected or work performed, but was corrected.</p>	<p>Draft Final deliverables are of very poor quality and are rejected for re-submittal without comment. Final deliverables did not comply with contract requirements, or one or more document versions required more than three (3) rounds of Army comments before being approved.</p> <p>Army audit of work identifies deficiencies that compromise the quality of the data collected or work performed, and cannot be corrected.</p>

Performance Standard	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
<b>Performance Category: Schedule</b>					
<b>Schedule</b>	Contractor Achieves milestone more than 90 days ahead of schedule (unless the COR waives this requirement), per criteria established in the PWS and the QASP.	Contractor Achieves milestone less than 90 days but more than 30 days ahead of schedule (unless the COR waives this requirement), per criteria established in the PWS and the QASP.	Contractor achieves milestone according to the schedule (unless the COR waives this requirement), per criteria established in the PWS and the QASP.	Contractor achieves milestone more than 30 days but less than 90 days behind schedule (unless the COR waives this requirement), per criteria established in the PWS and the QASP.	Contractor achieves milestone more than 90 days behind schedule (unless the COR waives this requirement), per criteria established in the PWS and the QASP.
<b>Performance Category: Safety</b>					
<b>Safety</b>	No significant safety deficiencies are reported during QA inspection of fieldwork. No lost time accidents or injuries are recorded during the fieldwork.	No more than one (1) serious safety deficiencies are reported during QA inspection of fieldwork. If any serious safety deficiency is noted during the project, appropriate investigation, corrective action, implementation, and written verification of the corrective action are provided to the Army. No lost time accidents or injuries are recorded during the fieldwork.	No more than two (2) serious safety deficiencies are reported during QA inspection of fieldwork. If any serious safety deficiency is noted during the project, appropriate investigation, corrective action, implementation, and written verification of the corrective action are provided to the Army. No lost time accidents or injuries are recorded during the fieldwork.	No more than three (3) serious safety deficiencies are reported during QA inspection of fieldwork. If any serious safety deficiency is noted during the project, appropriate investigation, corrective action, implementation, and written verification of the corrective action are provided to the Army. No more than one lost time accident or injury is recorded during the fieldwork.	More than three (3) serious safety deficiencies are reported during QA inspection of field activities, or a serious safety deficiency is reported but not properly investigated and corrected, or two or more lost time accidents or injuries is recorded during the fieldwork.
<b>Performance Category: Management of Key Personnel and Resources</b>					
<b>Management of Key Personnel and Resources</b>	All personnel proposed by the contractor were assigned to the project. Some personnel were	All personnel proposed by the contractor were assigned to the project. Some personnel were substituted by	All personnel proposed by the contractor were assigned to the project. Some personnel were substituted by	All personnel proposed by the contractor were assigned to the project. Some personnel were substituted by	All personnel proposed by the contractor were assigned to the project. Some personnel were substituted by

Performance Standard	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
	<p>substituted by higher qualified individuals.</p> <p>Zero (0) instances of resource management issues creating a negative impact to the activity.</p>	<p>higher qualified individuals.</p> <p>No more than one (1) instance of resource management issues creating a negative impact to the activity.</p>	<p>equally qualified individuals.</p> <p>Informal poor performance feedback on conduct of personnel is provided by the COR but are corrected.</p> <p>No more than two (2) instances of resource management issues creating a negative impact to the activity.</p>	<p>equally qualified individuals.</p> <p>Formal letter of poor performance feedback on conduct of personnel is provided by the COR but are corrected.</p> <p>No more than three (3) instances of resource management issues creating a negative impact to the activity.</p>	<p>lesser qualified individuals.</p> <p>Written request from KO requesting removal of assigned personnel for poor performance or notification of poor performance is provided by the COR and is not corrected.</p> <p>More than three (3) instances of resource management issues creating a negative impact to the activity.</p>
<b>Performance Category: Stakeholder Concurrence</b>					
<b>Stakeholder Concurrence</b>	Contractor obtains concurrence on deliverables from all Army stakeholders to include USAEC and the installation and from Federal and/or State regulators. This concurrence is obtained independently with little involvement and	Contractor obtains concurrence on deliverables from all Army stakeholders to include USAEC and the installation and from Federal and/or State regulators. This concurrence is obtained independently with limited involvement and coordination required by the Government.	Contractor obtains concurrence on deliverables from all Army stakeholders to include USAEC and the installation and from Federal and/or State regulators. This concurrence is obtained with moderate involvement and coordination required by the Government.	Contractor obtains concurrence on deliverables from all Army stakeholders to include USAEC and the installation and from Federal and/or State regulators. This concurrence is obtained with significant involvement and coordination required by the Government.	Contractor does not obtain concurrence on deliverables from Army stakeholders to include USAEC and the installation and/or from Federal and/or State regulators.

Performance Standard	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
	coordination required by the Government.				
<b>Performance Category: Cost Control (Applicable for Cost Reimbursement Contracts Only)</b>					
NA	NA	NA	NA	NA	NA

**3.3** If a milestone/deliverable as described in the QASP is rated as being of unsatisfactory quality at the time that the PMP deadline for the milestone/deliverable expires, the milestone/deliverable will automatically receive an unsatisfactory rating for timeliness. At no point will a milestone/deliverable receive an exceptional, very good, or satisfactory rating for timeliness if it is rated as being of unsatisfactory quality. Overall satisfactory performance on a milestone/deliverable requires ratings of satisfactory, very good or exceptional for the quality, timeliness, and safety standards.

## **4.0 Surveillance Methodology**

The surveillance methods listed below will be used in the execution of this QASP.

### **4.1 100% Inspection**

All key milestones and deliverables will be evaluated through 100% inspection (e.g., on-site inspection, document review). The COR will document performance for each completed milestone/deliverable prior to payment, as described in Section 5.0 of the QASP.

### **4.2 Periodic Progress Inspection**

At the COR's discretion, periodic inspections may be conducted to evaluate progress toward and/or completion of key milestones and deliverables. The COR may complete a periodic progress inspection if s/he believes that deficiencies exist that must be addressed prior to milestone/deliverable completion. While corrective action or re-performance will be required if necessary, the Contractor will not be financially penalized for unacceptable performance recorded in periodic progress reports, provided that final performance evaluation of the milestone/deliverable is deemed acceptable.

### **4.3 Customer Feedback**

Additional feedback will be obtained through random customer feedback. To be considered valid, input must set forth clearly and in writing the detailed nature of the feedback, must be signed, and must be forwarded to the KO. The KO will maintain a summary log of all formally received customer feedback as well as a copy of each feedback in a documentation file.

## **5.0 Surveillance Documentation**

**5.1** Quality Assurance Monitoring Form. The COR will use a performance evaluation form to record evaluation of the Contractor's performance for each milestone and deliverable in accordance with the methodology described in Sections 3.0 and 4.0 of the QASP. The COR

must substantiate, through narratives in the form, all exceptional, very good, marginal, and unsatisfactory ratings. Performance at the satisfactory level is expected from the Contractor. At a minimum, the evaluation form will indicate actual and scheduled delivery times and number of reviews required to achieve the final product. The COR will forward copies of all completed performance evaluation forms to the KO and Contractor within one week of performing the inspection.

**5.2 Corrective Action Process.** When a milestone/deliverable receives an overall marginal or unsatisfactory rating, the Contractor will explain, within 15 days, in writing to COR why performance was marginal or unsatisfactory, how performance will be returned to satisfactory levels, and how recurrence of the problem will be prevented in the future.

**5.3 KO Role in the Surveillance Process.** The KO will review each performance evaluation form prepared by the COR. When appropriate, the KO may investigate further to determine if all the facts and circumstances surrounding the event were considered in the COR opinions outlined on the form. The KO will immediately discuss any marginal or unsatisfactory rating with the Contractor to assure that corrective action is promptly initiated.

**5.4 Annual Performance Assessment.** At the end of every year, the COR will prepare a written Contractor Performance Assessment Report (CPAR) for the KO summarizing the overall results of his/her surveillance of the Contractor's performance during the previous 12 months. This report will become part of the formal QA documentation.

**5.5 QA File.** The COR will maintain a complete QA file. This file will contain copies of all performance evaluation forms and any other related documentation. The COR will forward these records to the KO at termination or completion of the contract. All performance assessment forms, attachments and working papers must be marked "FOR OFFICIAL USE ONLY/SOURCE SELECTION INFORMATION - SEE FAR 2.101 AND 3.104" according to Freedom of Information Act Program, FAR 3.104, and 41 USC Sect. 423. Assessment reports may also contain information that is proprietary to the contractor. Information contained on the CPAR, such as trade secrets and protected commercial or financial data obtained from the contractor in confidence, must be protected from unauthorized disclosure. COR's shall annotate on the assessment report if it contains material that is a trade secret, etc., to ensure that future readers of the evaluations are informed and will protect as required. Contractor performance information is privileged source selection information. It is also protected by the Privacy Act and is not releasable under the Freedom of Information Act.

## **6.0 Payment and Corrective Action**

**6.1 Satisfactory Performance.** Full payment for a milestone/deliverable will be provided upon verification of overall satisfactory performance, as rated on quality and schedule. This verification will be recorded in a performance evaluation form submitted to the KO specifying overall Contractor performance as satisfactory, very good, or exceptional for the milestone/deliverable.

**6.2 Marginal or Unsatisfactory Performance.** If a milestone/deliverable receives a marginal or unsatisfactory rating for the quality performance standard, re-performance is required until the

milestone/deliverable receives a rating of satisfactory or better. This re-performance is required regardless of cost or schedule constraints that may result from the marginal or unsatisfactory performance, unless the KO has opted to terminate the contract. If a rating of satisfactory or better is not achieved, the Government may reduce the contract price to reflect the reduced value of the services in accordance with FAR 52.246-4(e).

**6.3** Table 2 in the QASP provides a sample of the minimum key elements planned for the QASP. The final QASP will be developed with the COR and the contractor and will be based on the final PMP.

Additional Government surveillance activities may include, but are not limited to, the following:

- Work plan review and approval
- Participation in Technical Project Planning (or equivalent) sessions
- Oversight of geophysical survey & analysis activities
- Oversight of drilling, field sampling activities
- Oversight of all waste management functions/responsibilities
- Review of all waste management documentation
- Separate/split laboratory QA samples
- Review and approval of all access agreements associated with off-site areas
- Review and approval of meeting minutes from RAB/BCT meetings
- Review and approval of all deliverables to regulatory agencies
- Review and approval of FS options to be considered
- Review of quality control documentation
- Review of project safety record
- Adherence to the approved work plan

**Table 2 (SAMPLE) QASP Performance Objectives, Acceptance Criteria, and Monitoring Methods**

<i>Performance Objectives</i>	<i>Performance Standards</i>	<i>Acceptable Quality Levels</i>
<p>Approved Project Management Plan (PMP) and Quality Assurance Surveillance Plan (QASP):</p> <ul style="list-style-type: none"> <li>• Draft PMP and QASP within 30 calendar days of contract award,</li> <li>• Final PMP within 30 calendar days of receipt of COR comments on the drafts.</li> </ul>	<p>Army approval through the Contracting Officer's Representative (COR).</p>	<p>Exceptional, Very Good, or Satisfactory performance, as defined in Table 2 of the PWS.</p>

**Monitoring Method:** 100% inspection of milestones / deliverables associated with objective

*What we're looking for:*

- Detailed technical approach included in the PMP
- Project Team and Roles and Responsibilities are included in the PMP
- Interim Payment schedule included in the PMP
- Activity-based schedule included in the PMP
- Complete document submittal distribution list included in the PMP
- Project Status reports provided as proposed
- The Contractor keeps a record of each phone conversation, written correspondence, and meeting minutes affecting decisions related to the performance of this scope of work. Copies of this correspondence are submitted to the COR.

## QUALITY ASSURANCE MONITORING FORM

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Work Task (Milestone/Activity): \_\_\_\_\_

Survey Period: \_\_\_\_/\_\_\_\_/\_\_\_\_ through \_\_\_\_/\_\_\_\_/\_\_\_\_

Method of Surveillance: COR Review

Evaluation of Contractor's Performance: \_\_\_\_\_

Evaluation

Corrective Action Required: ☐ Yes ☐ No

Narrative Discussion of Contractor's Performance During Survey Period:

Discussion

CORRECTIVE ACTION FORM FOR QASP

1) Work Task (Milestone/Activity): \_\_\_\_\_

2) Survey Period: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ through \_\_\_\_/\_\_\_\_/\_\_\_\_\_

3) Description of the Failure/Deficiency that Precipitated the Corrective Action:

Description

4) Description of the Criterion that the Failure/Deficiency was Evaluated Against:

Description

5) Personnel Involved in the Identification of the Failure/Deficiency, Determination of the Appropriate Corrective Action, Approval of the Corrective Action, and Implementation of the Corrective Action:

Description

6) Description of the Corrective Action that was Required:

Description

7) Date/Time of Implementation of the Corrective Action: \_\_\_\_/\_\_\_\_/\_\_\_\_\_

Description

8) Follow-Up Information to Prevent Recurrence of Failure/Deficiency (i.e., Need For Revision of Procedures or Specifications):

Description

9) Personnel Responsible for Follow-Up Work:

Description

10) Planned Date for Follow-Up Surveillance: \_\_\_\_/\_\_\_\_/\_\_\_\_\_

11) Other

## Attachment F: FIGURES

**ATTACHMENT C**  
**MILESTONE PAYMENT SCHEDULE**

**KEMRON**  
**Contract: W912DY-10-D-0027 Delivery Order: DS01**  
**Project Name: RI/FS for AOI North Castner Range**  
**Fort Bliss, TX**

CLIN	Milestone Description	Approval Requirements	CLIN Funded	Invoice Date	Milestone Payment	Sub CLIN	CLIN Amount	Invoice Amount	Cumulative Invoiced Amount
0001	<b>Achieve Planning Documents</b>		Yes				\$ 113,422.55		\$ -
0001AA	<b>Kickoff Meeting</b>		Yes			\$ 22,623.09			
		Government Acceptance of Meeting Minutes	Yes		\$ 22,623.09				
0001AB	<b>Project Management Plan</b>		Yes			\$ 9,459.13			
	Draft PMP	Government Acceptance of Draft PMP	Yes		\$ 7,567.30			\$ -	\$ -
	Final PMP	Government Approval of Final PMP	Yes		\$ 1,891.83			\$ -	\$ -
0001AC	<b>QASP</b>		Yes			\$ 6,786.74			
	Draft QASP	Government Acceptance of Draft QASP	Yes		\$ 5,429.39			\$ -	\$ -
	Final QASP	Government Approval of Final QASP	Yes		\$ 1,357.35			\$ -	\$ -
0001AD	<b>Work Plan and SSHP/APP</b>		Yes			\$ 37,170.43			
	Draft Work Plan and SSHP/APP	Government Acceptance of Draft Work Plan and SSHP/APP	Yes		\$ 26,019.30			\$ -	\$ -
	Draft Final Work Plan and SSHP/APP	Government Approval of Draft Final Work Plan and SSHP/APP	Yes		\$ 3,717.04			\$ -	\$ -
	Final Work Plan and SSHP/APP	Government/Regulatory Approval of Final Work Plan and SSHP/APP	Yes		\$ 7,434.09			\$ -	\$ -
0001AE	<b>Explosives Site Plan</b>		Yes			\$ 11,318.67			
	Draft Explosives Site Plan	Government Acceptance of Draft Explosives Site Plan	Yes		\$ 9,054.94			\$ -	\$ -
	Final Explosives Site Plan	Government/DDESB Approval of Final Explosives Site Plan	Yes		\$ 2,263.73			\$ -	\$ -
0001AF	<b>GIS/CSM</b>		Yes			\$ 10,891.89			
	Draft GIS/CSM	Government Acceptance of Draft GIS/CSM	Yes		\$ 8,713.51			\$ -	\$ -
	Final GIS/CSM	Government/Regulatory Approval of Final GIS/CSM	Yes		\$ 2,178.38			\$ -	\$ -
0001AG	<b>Historical Records Search</b>		Yes			\$ 15,172.60			
	Draft Historical Records Search Report	Government Acceptance of Draft Historical Records Search Report	Yes		\$ 12,138.08			\$ -	\$ -
	Final Historical Records Search Report	Government/Regulatory Approval of Final Historical Records Search Report	Yes		\$ 3,034.52			\$ -	\$ -
0002	<b>Achieve Community Relations Support</b>		Yes				\$ 163,475.15		\$ -
0002AA	<b>Community Relations Plan</b>		Yes			\$ 15,118.79			
	Draft Community Relations Plan	Government Acceptance of Draft Community Relations Plan	Yes		\$ 12,095.03			\$ -	\$ -
	Final Community Relations Plan	Government Approval of Final Community Relations Plan	Yes		\$ 3,023.76			\$ -	\$ -
0002AB	<b>Public Meetings</b>		Yes			\$ 31,197.41			
	Public Meeting #1	Government Approval of Meeting Minutes	Yes		\$ 15,598.71			\$ -	\$ -
	Public Meeting #2	Government Approval of Meeting Minutes	Yes		\$ 15,598.71			\$ -	\$ -
0002AC	<b>Presentation of Projects</b>		Yes			\$ 41,727.81			
	Presentation of Projects #1	Government Approval of Presentation	Yes		\$ 10,431.95			\$ -	\$ -
	Presentation of Projects #2	Government Approval of Presentation	Yes		\$ 10,431.95			\$ -	\$ -
	Presentation of Projects #3	Government Approval of Presentation	Yes		\$ 10,431.95			\$ -	\$ -
	Presentation of Projects #4	Government Approval of Presentation	Yes		\$ 10,431.95			\$ -	\$ -
0002AD	<b>Technical Project Planning (TPP) Meetings</b>		Yes			\$ 43,956.77			
	Technical Project Planning Meeting #1	Government Approval of Meeting Minutes	Yes		\$ 14,652.26			\$ -	\$ -
	Technical Project Planning Meeting #2	Government Approval of Meeting Minutes	Yes		\$ 14,652.26			\$ -	\$ -
	Technical Project Planning Meeting #3	Government Approval of Meeting Minutes	Yes		\$ 14,652.25				
0002AE	<b>Restoration Advisory Board Meeting</b>		Yes			\$ 31,474.37			
	Restoration Advisory Board Meeting #1	Government Approval of Meeting Minutes	Yes		\$ 10,491.46			\$ -	\$ -
	Restoration Advisory Board Meeting #2	Government Approval of Meeting Minutes	Yes		\$ 10,491.46			\$ -	\$ -
	Restoration Advisory Board Meeting #3	Government Approval of Meeting Minutes	Yes		\$ 10,491.45				
0003	<b>Achieve RI at AOI North of Castner Range</b>		Yes				\$ 595,556.54		\$ -
0003AA	<b>Field Kick-Off Meetings</b>		Yes			\$ 20,237.19			
	Field Kick-Off Meetings	Government Approval of Meeting Minutes	Yes		\$ 20,237.19			\$ -	\$ -
0003AB	<b>Mobilization/Demobilization</b>		Yes			\$ 29,562.50			
	Mobilization	Government Approval of Field Activity Report	Yes		\$ 14,781.25			\$ -	\$ -
	Demobilization	Government Approval of Field Activity Report	Yes		\$ 14,781.25			\$ -	\$ -
0003AC	<b>Location Surveys and Mapping</b>		Yes			\$ 42,010.35			
	Survey Data	Government Approval of Final Survey	Yes		\$ 42,010.35				\$ -
0003AD	<b>Geophysical/Visual Survey</b>		Yes			\$ 181,735.23			
	Geophysical Data Delivery #1	Government Approval of Final Geophysical Data 50%	Yes		\$ 90,867.62			\$ -	\$ -
	Geophysical Data Delivery #2	Government Approval of Final Geophysical Data 100%	Yes		\$ 90,867.60			\$ -	\$ -
0003AE	<b>MEC Characterization/Identification/Disposal</b>		Yes			\$ 192,276.62			
	MEC Investigation 50% Complete	Government Approval of Field Activity Report 50% Complete	Yes		\$ 96,138.31			\$ -	\$ -
	MEC Investigation 100% Complete	Government Approval of Field Activity Report 50% Complete	Yes		\$ 96,138.31			\$ -	\$ -

**KEMRON**  
**Contract: W912DY-10-D-0027 Delivery Order: DS01**  
**Project Name: RI/FS for AOI North Castner Range**  
**Fort Bliss, TX**

CLIN	Milestone Description	Approval Requirements	CLIN Funded	Invoice Date	Milestone Payment	Sub CLIN	CLIN Amount	Invoice Amount	Cumulative Invoiced Amount
0003AF	MC Sampling		Yes			\$ 59,284.15			
	MC Sampling	Government Approval of Final Analytical Data	Yes		\$ 59,284.15			\$ -	\$ -
0003AG	Final RI Report		Yes			\$ 70,450.51			
	Draft RI Report	Government Acceptance of Draft RI Report	Yes		\$ 49,315.36			\$ -	\$ -
	Draft Final RI Report	Government Approval of Draft Final RI Report	Yes		\$ 7,045.05			\$ -	\$ -
	Final RI Report	Government/Regulatory Approval of Final RI Report	Yes		\$ 14,090.10			\$ -	\$ -
0004	Achieve FS at AOI North of Castner Range		Yes				\$ 45,198.21		
0004	Achieve FS at AOI North of Castner Range		Yes			\$ 45,198.21			
	Draft FS Report	Government Acceptance of Draft FS Report	Yes		\$ 31,638.75			\$ -	\$ -
	Draft Final FS Report	Government Approval of Draft Final FS Report	Yes		\$ 4,519.82			\$ -	\$ -
	Final FS Report	Government/Regulatory Approval of Final FS Report	Yes		\$ 9,039.64			\$ -	\$ -
0005	Achieve PP at AOI North of Castner Range		Yes				\$ 26,588.37		
0005	Achieve PP at AOI North of Castner Range		Yes			\$ 26,588.37			
	Draft PP	Government Acceptance of Draft PP	Yes		\$ 18,611.86			\$ -	\$ -
	Draft Final PP	Government Approval of Draft Final PP	Yes		\$ 2,658.84			\$ -	\$ -
	Final PP	Government/Regulatory Approval of Final PP	Yes		\$ 5,317.67			\$ -	\$ -
0006	Achieve DD at AOI North of Castner Range		Yes				\$ 30,163.12		
0006	Achieve DD at AOI North of Castner Range		Yes			\$ 30,163.12			
	Draft DD	Government Acceptance of Draft DD	Yes		\$ 21,114.18			\$ -	\$ -
	Draft Final DD	Government Approval of Draft Final DD	Yes		\$ 3,016.31			\$ -	\$ -
	Final DD	Government/Regulatory Approval of Final DD	Yes		\$ 6,032.62			\$ -	\$ -
0007	Prepare and Provide Access to Administrative Record for AOI North of Castner Range		Yes				\$ 9,136.56		
0007	Prepare and Provide Access to Administrative Record for AOI North of Castner Range		Yes			\$ 9,136.56			
	Final Administrative Record	Government approval of Structured Project File Record	Yes		\$ 9,136.56				
0008	Achieve Fencing and Signage for Archeology and Border Patrol Museum Area		Yes				\$ 56,785.52		
0008	Achieve Fencing and Signage		Yes			\$ 56,785.52			
	Final Completion Letter	Government approval of Final Completion Letter	Yes		\$ 56,785.52				
				TOTALS		\$ 1,040,326.03	\$ 1,040,326.02	\$ -	

## **RECORD OF ENVIRONMENTAL CONSIDERATION**

**PROJECT TITLE:** Development and Operation of a Temporary Residential Center for Alien Families for the Department of Homeland Security (DHS) and a Temporary Influx Care Facility (ICF) for Unaccompanied Alien Children (UAC) for the Department of Health and Human Services (DHHS) on Fort Bliss, Texas.

**BRIEF DESCRIPTION:** The Army and Fort Bliss have been directed by the Secretary of Defense to support the Immigration and Customs Enforcement/Department of Homeland Security (DHS) request for temporary use of Fort Bliss land for a Family Residential Center (FRC), dated 26 June 2018. The Secretary of Defense has approved support for alien families (up to a combined total of 4,000 parents and children) on land at Fort Bliss. The Secretary of Defense also approved support to the Department of Health and Human Services (DHHS) for temporary facilities to house up to 20,000 unaccompanied alien children (UACs) at DoD property (with immediate provision for 7,500 UACs at Fort Bliss). The Army has proposed this action to occur on an undeveloped parcel of land along the southern boundary of Fort Bliss. The Army will issue a land use permit or outgrant to DHS and DHHS of the land parcels for their use.

This Record of Environmental Consideration (REC) constitutes Army and DHHS compliance with the National Environmental Policy Act of 1969 (NEPA) for this project. DHS will prepare its own REC.

The approximate 250-acre project area is within a parcel on the Main Cantonment area of Fort Bliss. The environmental impacts for this temporary action are considerably less than those determined under existing NEPA documents discussed below. In addition, several of the Army's NEPA categorical exclusions apply. Therefore, no further NEPA analysis is required.

### **BACKGROUND:**

- 1) Fort Bliss serves as the home to the 1st Armored Division. It encompasses over 1.12 million acres of land in New Mexico and Texas. Its main Cantonment Area is located adjacent to El Paso, Texas.
- 2) In 2016 Fort Bliss issued a permit to DHHS to house up to 3,240 UAC, ages 13 – 17 and DHHS staff in accordance with its UAC program. DHHS occupied existing facilities on Doña Ana base camp. DHHS personnel and its contractors were responsible for the oversight, security, and operation of the facility, which was able to provide a safe and secure residential community for UACs successfully. That site is no longer available because of Army mission requirements.
- 3) In Executive Order 13767, dated 25 January 2017, "Border Security and Immigration Enforcement Improvements," the President stated that border security was necessary "to ensure the safety and territorial integrity of the United States." On 20 June 2018, the President signed Executive Order 13841, "Affording Congress an Opportunity to Address Family Separation." The 2018 order stated that it is "the policy of this Administration to maintain family unity, including by detaining alien families together where appropriate and consistent with law and available resources." The order directed the Secretary of DHS to maintain custody of alien families during the pendency of any criminal improper entry or immigration proceedings involving their members. The order then directed the Secretary of Defense to take all legally available measures to provide to DHS, upon request, any existing facilities available for the housing and care of alien families, and to construct such facilities if necessary and consistent with law. The Secretary of Homeland Security, to the extent permitted by law, shall be responsible for the reimbursement of these facilities.

4) Section 2815 of the National Defense Authorization Act (NDAA) for Fiscal Year 2017 requires, prior to providing another department or agency with a vacant facility for the purposes of temporary housing support, the Secretary of Defense to certify to the House and Senate Armed Services Committees that the provision of the facility will not negatively affect military training, operations, readiness or other military requirements.

5) The DHS made a formal request for assistance to the Department of Defense on 29 June 2018. It included the following details:

"The requested facilities, with furnishings, must provide for the custody and safety of up to 12,000 family residents, consisting of male and female heads of household and their minor children. The structures will need to prevent unauthorized entry by persons not participating in the detention program and allow for open movement by residents within the facilities. The facilities must be compliant with the JCE Family Residential Standards . . . , and the conditions set forth in . . . the Flores Settlement Agreement.

"The location of the facilities must be within the continental United States, ideally along the southwest border within the states of California, New Mexico, Arizona, or Texas, because the majority of family units with minors are apprehended in those states, and, as noted above, under the Flores Settlement Agreement DHS is required to use reasonable efforts to place minors in the geographic area where they were apprehended. Locations in other states will be considered based on the location's strategic, complementary, or financial benefits to ICE. Facilities should be located in proximity to infrastructure such as airports, highways, hospitals, phone/internet service(s), medical and mental health services, educational services, and more general human capital in order to limit the need to detail staff to cover facility operations."

Fort Bliss meets these criteria because it is in two southwest border states, and it has sufficient infrastructure. The El Paso area also has the required human capital to support the operation.

6) On 19 Jun 2018 DHHS requested the Department of Defense to provide 20,000 temporary beds for UACs. DHHS would retain responsibility for care and custody of the UACs. On 3 Jul 2018 DHHS further refined its request for DoD support.

7) Fort Bliss was identified as a possible site for this support because of its facilities and its proximity to the border with Mexico. Fort Bliss, in turn, identified a 1,635 acre site in its Southeast Cantonment area as a potential site for support to DHS and DHHS (attachment). This site was identified because it could be used without interfering with the missions at Fort Bliss and because it had been the subject of recent environmental review. This meant that the parcel could be made available more quickly.

8) On 29 June 2018, the Secretary of Defense approved the DHHS request for DoD to provide for up to 20,000 temporary beds for UACs on DoD installations, with 7,500 at Fort Bliss. The Secretary of Defense also approved the DHS request for DoD to provide capacity for up to 12,000 alien family members on DoD installations with 4,000 at Fort Bliss. The Secretary also directed notification of Congress in accordance with section 2815 of the NDAA for Fiscal Year 2017 that the provision of support to DHHS and DHS would not negatively affect military training, operations, readiness, or other military requirements.

#### **DESCRIPTION OF THE PROPOSED ACTION:**

1) The total area of the project (for both DHS and DHHS) will be about 250 acres. The project will require clearing and leveling land, provision of utilities, construction of temporary buildings, and

security measures. This will be on the parcel of land designated "Parcel 2" on the attachment. The DHHS site will be in the same parcel, but preferably not within line of sight of the DHS site.

2) Once the facilities are constructed, activities will include residential living, food preparation, schooling for children, medical care, recreational and religious activities, and security. Activities may require operation of diesel-powered generators.

3) In addition to these activities, the project may involve use of the Site Monitor facility, just east of the 1,635 acre parcel. The Site Monitor facility consists of several buildings that are currently unoccupied. The site is not used for any kind of monitoring activities. The buildings have electric power and a water supply. The buildings could be used for administrative purposes.

4) Initial site preparation may begin as early as August, 2018. The duration of operation will initially be until 31 December 2018, but may be extended.

#### **STANDARDS TO BE APPLIED:**

1) Army's NEPA regulation states at 32 CFR §651.19:

A Record of Environmental Consideration (REC) is a signed statement submitted with project documentation that briefly documents that an Army action has received environmental review. RECs are prepared for . . . actions covered by existing or previous NEPA documentation.

In addition the Council on Environmental Quality (CEQ) NEPA regulation requires agencies to supplement a Final EIS when:

(i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. 40 CFR 1502.9(c).

The Army NEPA regulation mirrors that of CEQ:

(g) Army NEPA documentation must be periodically reviewed for adequacy and completeness in light of changes in project conditions.

(1) Supplemental NEPA documentation is required when:

(i) The Army makes substantial changes in the proposed action that are relevant to environmental concerns; or

(ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact.

(2) This review requires that the proponent merely initiate another "hard look" to ascertain the adequacy of the previous analyses and documentation in light of the conditions listed in paragraph (g)(1) of this section. If this review indicates no need for new or supplemental documentation, a REC can be produced in accordance with this part.

Proponents are required to periodically review relevant existing NEPA analyses to ascertain the need for supplemental documentation and document this review in a REC format. 32 CFR 651.5(g).

This section also states:

Army NEPA documentation must be periodically reviewed for adequacy and completeness in light of changes in project conditions.

(1) Supplemental NEPA documentation is required when:

(i) The Army makes substantial changes in the proposed action that are relevant to environmental concerns; or

(ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact.

(2) This review requires that the proponent merely initiate another "hard look" to ascertain the adequacy of the previous analyses and documentation in light of the conditions listed in paragraph (g)(1) of this section.

2) In addition to the existing NEPA analyses described below, the proposed action is also exempted from further NEPA analysis under several of the Army's categorical exclusions. 32 CFR §651.28 explains that categorical exclusions (CXs) are categories of actions with no individual or cumulative effect on the human or natural environment, and for which neither an environmental assessment nor an environmental impact statement is required. The use of a CX is intended to reduce paperwork and eliminate delays in the initiation and completion of proposed actions that have no significant impact. When determining documentation required to comply with NEPA, Army action proponents should first determine whether a categorical exclusion (CX) applies to the proposed action (See Figure 1, 32 CFR Part 651). If it does, the proponent then prepares a record of environmental consideration REC, if required by the CX.

3) There are three requirements for use of a CX for an action (§651.29):

a. The action has not been improperly segmented;

b. No exceptional circumstances exist (as listed in §651.29);

c. One (or more) CXs encompass the proposed action.

Exceptional circumstances include a situation in which a proposed action would adversely affect "environmentally sensitive" resources such as endangered species, or a reasonable likelihood of significant effects on public health, safety, or the environment.

If all of these screening factors apply, the proposed action does not require an environmental assessment or an environmental impact statement.

4) Categorical Exclusions are set out in Appendix B of 32 CFR Part 651 and include the following, which are applicable to the proposed action described in this REC:

(b) Administration/operation activities:

(2) Emergency or disaster assistance provided to federal, state, or local entities (REC required).

(4) Proposed activities and operations to be conducted in an existing non-historic structure which are within the scope and compatibility of the present functional use of the building, will not result in a substantial increase in waste discharged to the environment, will not result in substantially different waste discharges from current or previous activities, and emissions will remain within established permit limits, if any.

(f) Real estate activities:

(1) Grants or acquisitions of leases, licenses, easements, and permits for use of real property or facilities in which there is no significant change in land or facility use. Examples include, but are not limited to, Army controlled property and Army leases of civilian property to include leases of training, administrative, general use, special purpose, or warehouse space (REC required).

(g) Repair and maintenance activities:

(1) Routine repair and maintenance of buildings, airfields, grounds, equipment, and other facilities. Examples include, but are not limited to: Removal and disposal of asbestos containing material (for example, roof material and floor tile) or lead-based paint

in accordance with applicable regulations; removal of dead, diseased, or damaged trees; and repair of roofs, doors, windows, or fixtures (REC required for removal and disposal of asbestos-containing material and lead-based paint or work on historic structures).

(h) Hazardous materials/hazardous waste management and operations:

(4) Routine management, to include transportation, distribution, use, storage, treatment, and disposal of solid waste, medical waste, radiological and special hazards (for example, asbestos, PCBs, lead-based paint, or unexploded ordnance), and/or hazardous waste that complies with EPA, Army, or other regulatory agency requirements. This CX is not applicable to new construction of facilities for such management purposes.

#### **COVERAGE BY EXISTING NEPA DOCUMENTATION:**

1) Existing documentation: The following NEPA documents cover the proposed action in whole or part: the "Fort Bliss, Texas and New Mexico Mission and Master Plan Supplemental Programmatic Environmental Impact Statement" (2007 EIS), for which a Record of Decision was signed on 30 April 2007; the "Fort Bliss Army Growth and Force Structure Realignment EIS," (2010 EIS) for which a Record of Decision was signed on 8 June 2010; and the Environmental Assessment (EA) for the "Sale, Development, and Exchange of Army-owned Land" (2012 EA) for which a Finding of No Significant Impact (FNSI) was signed on 21 September 2012. This EA analyzed the possible non-Army use of an approximately 1600-acre parcel, which includes the DHS and DHHS sites. The EA was made available to the public for comment.

2) Fort Bliss reviewed these existing documents in light of changes to the affected environment since they were prepared to determine if there are any significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact that would require supplementation. The EISs continue to be valid, although the expected growth did not completely occur. The transfer of the parcel (now proposed for use by DHS and DHHS) analyzed in the 2012 EA also did not occur. There also have been no substantial changes to natural resources such as listing of new species as threatened or endangered affecting Fort Bliss. Regarding the 1,635 acre parcel in the current proposed action, there has been no development of the parcel; no new contamination or hazardous waste discovered; and no change to natural resources, to include plants and animals.

Fort Bliss has therefore determined that there are no significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact. In particular, the FNSI for the 2012 EA regarding the parcel identified for the current proposed action remains valid. Therefore supplementation of the 2007 EIS, the 2010 EIS, and the 2012 EA is not required.

3) Application of analysis in the EISs. The 2007 EIS analyzed a strength of four Brigade Combat Teams at Fort Bliss. The BRAC Commission recommended the relocation of air defense artillery units and the 1st Armored Division from Korea and Germany to Fort Bliss. The Record of Decision for the Growth and Force Structure Realignment EIS (2010) selected an alternative that allowed for an increase in Fort Bliss BCTs from four to six. The EIS determined that there would be significant impacts in the areas of noise and airspace. These impacts would mainly be from military training. Impacts to traffic on Fort Bliss and public roadways were expected to be less than significant although there would have been a 28% increase over the 2010 baseline. The selected alternative included redevelopment of 480 acres and additional building construction of 3.32 million square feet. The additional impervious surface was expected to increase by 630 acres. The number of Soldiers stationed at Fort Bliss would increase by approximately 11,300 to 51,800, and the overall stationed population of Fort Bliss (including military families) would increase to approximately 152,800 people.

The level of growth anticipated in the 2007 and 2010 EISs did not occur. The increased population from the DHS and DHHS proposed action, when added to the current population of Fort Bliss would not exceed the population studied in the 2010 EIS. Its current population comprises 38,589 active duty Soldiers, 39,422 Family members, 13,079 civilians, and 1,253 reservists. <http://armybases.org/fort-bliss-tx-texas/> (2018). When these numbers are subtracted from the previously analyzed 152,800 population, Fort Bliss will still be able to support over 60,000+ more occupants.

In addition, many of the impacts identified in the 2010 EIS are associated with military training or daily commuting. There will be no military training at the proposed facilities and commuting will be limited to staff and not residents.

Therefore, the impacts from the level of population growth on the Fort Bliss cantonment area as a whole are within those covered in the 2007 and 2010 EISs.

4) Application of the 2012 EA. The 2012 EA analyzed development of the proposed parcel as "Alternative 2." This development included sale of the property to a private developer and annexation by the City of El Paso. To assess the greatest potential impacts of this alternative, it is assumed that the property would be developed as a combination of residential, retail, and community facilities and mixed-use buildings based on the City of El Paso's SmartCode Growth Plan, which is the densest development allowed. Applying the SmartCode Growth Plan within Parcel A would allow approximately 19,000 households and 200 businesses. (2012 EA, 25).

The EA concluded that there would be minor direct and indirect impacts on surface water, groundwater, cultural resources, biological resources, air quality, noise, hazardous materials and waste, health and safety, socioeconomics, and environmental justice. There would be moderate impacts on land use, soils, and utilities infrastructure; and on traffic and transportation once proposed mitigation strategies are implemented. Proposed mitigation measures and best management practices would reduce or eliminate the potential short- and long-term effects on the environment caused by the construction and development of the proposed land sale and/or exchange parcels. There were no significant impacts identified.

In terms of the general level of development analyzed for the parcel in the 2012 EA, the DHS and DHHS actions are well within the scope of the action analyzed. Below is a review of additional information about resource areas that will be affected by the proposed action:

- a. Archeological surveys of the project area have determined that no surface archeological sites exist that are eligible for inclusion in the National Register of Historical Properties. In the event of subsurface inadvertent discovery of human remains or artifacts during construction, Directorate of Public Works, Environmental Division (DPW-ED) archaeologists shall be contacted immediately. Stipulations of the Fort Bliss Programmatic Agreement with the TX State Historic Preservation Office (SHPO) will be followed including Standard Operating Procedure (SOP) #10: Accidental Discovery of Archaeological Properties and the Native American Graves Protection and Repatriation Act (NAGPRA). The portion of the Butterfield Trail that is in the 1,635 acre site will not be used for DHS or DHHS facilities or construction.
- b. The project area lacks suitable habitat for federal threatened and endangered species, and none have been found there. The approximately 250 acres of mesquite coppice dune habitat is much less than one percent of similar habitat on Fort Bliss. Impacts to other plant and animal species present will not significantly affect populations on Fort Bliss or at a more regional scale. The 2012 EA assumed 1,635 acres of this vegetation type would be cleared and lost but there would be minimal impacts since it is regionally common and abundant (2102 EA, 37).

- c. Construction storm water permitting is required for this project because the area of disturbance exceeds one acre. The calculation of the area of disturbance to be shown in the Storm Water Pollution Prevention Plan (SWP3) must also include contractor staging and laydown areas. The contractor for the project must prepare the SWP3 and Notice of Intent (NOI), or it can adopt Fort Bliss's SWP3. In addition, the Energy Independence and Security Act (EISA), Section 438, Low Impact Development /Green Infrastructure (LID/GI) drainage design requirements are triggered for projects exceeding 5,000 square feet. Drainage design should include, to the maximum extent technically feasible, the application of LID/GI design options in addition to conventional centralized on-site or off site storm water retention. Fort Bliss's commitment to these sustainable practices was noted in the 2012 EA (70).
- d. Site preparation involving clearing and grubbing requires submission of an excavation permit and its approval by the Fort Bliss Directorate of Public Works prior to initiating any ground disturbing activities.
- e. Dust during construction will be controlled through use of water spray trucks as required. Federal *de minimis* air quality thresholds are not expected to be exceeded.
- f. Use of diesel generators will not trigger regulatory air permit requirements as these items are considered mobile sources under 40 CFR Part 1068. The Environmental Protection Agency deems a portable generator stationary if it remains at the same location for more than 12 consecutive months. Should site operation extend beyond this period, the proponent (DHS or HHS, or both) will be required to obtain an air quality permit from Texas Commission on Environmental Quality (TCEQ). Generators left in place for more than one year; absent a permit, must be shut off.
- g. Petroleum, oil, and lubricant containers 55 gallons or larger can be added to the Fort Bliss Spill Prevention Control and Countermeasure Plan (SPCCP) for tracking inspection requirements. DHS/HHS will eventually need to develop their own SPCCP, subject to review by the Fort Bliss Staff.
- h. The Texas Department of Transportation has a 200 ft. easement on the south boundary of the Fort Bliss Main Cantonment for widening U.S. highway 62. This project is to alleviate increased traffic on the highway. The easement will not be utilized for these DHS or DHHS actions.
- i. Encountering unexploded ordnance (UXO) in the project area is unlikely. If UXO is encountered, all objects must be disposed of by Explosive Ordnance Disposal personnel per Fort Bliss approved procedures. In addition, the 2012 EA lists possible hazards on the property as "dehydration and heat illness, contact with venomous animals and spiny vegetation, and vehicle accidents" (2012 EA, 58). The DHS and HHS facilities would have to be designed and operated to avoid these hazards.
- j. There are no areas within the site requiring remediation under the Defense Environment Restoration Program (DERP), which identifies, investigates, and cleans up contamination and military munitions associated with past activities and DOD facilities. No above ground storage tanks or underground storage tanks are located within the project area, and no petroleum or hazardous waste spills have been recorded near these facilities. If any soil discoloration, odors, rubbish and/or any environmental concerns are uncovered, work at the site of the discovery will be suspended but may continue in areas not affected. The DPW-ED must be notified immediately of the findings.
- k. The 2012 EA mentions the "Rubble Dump Spill Site." All required remediation of this site has been completed and the state has certified that no further remedial action is required. The DHS and DHHS projects will not be located on this site. There is also an old FAA

facility. This site will not be used for the DHS and DHHS projects and residents will not be affected in any way by it.

- l. Surveys for lead-based paint and asbestos containing materials have been conducted for many of the structures within Site Monitor. Lead-based paint is present typically on thresholds, window sills, walls, beams, struts, columns, and floors. Asbestos was identified in wall and window caulking, sealant around wall penetrations, drywall, and joint compound. If families were to use these buildings, it is recommended that all previously painted interior wall surfaces, metal beams, struts, columns, pipes, and benches be repainted to ensure encapsulation of potential lead-based paint and asbestos containing materials and that painted floors be encapsulated with tile or some other material to prevent further abrasion.
- m. The structures at Site Monitor have been unoccupied for years, and an inspection for pest and rodent infestation is recommended prior to occupancy. Pest management is also recommended while the facility is in use.
- n. Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks" states that federal agencies shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that actions address disproportionate risks to children. There are no existing conditions that would pose environmental health risks and safety risks to children. The DHS and DHHS facilities will operate in such a way that environmental health risks and safety risks to all residents and staff will be minimized.

#### **COVERAGE BY CATEGORICAL EXCLUSIONS:**

As noted above, several CXs apply to the proposed action. CXs b(2), b(4), f(1), g(1), and h(4) meet the requirements for application to the proposed action.

- a. The action has not been improperly segmented. This action is not connected other actions and it is not a part of a larger action, such that it should be analyzed as part of a broader NEPA document. There are no similar actions and there are no other proposed actions to support the DHS or DHHS. The potential DHS and DHHS actions and their combined impacts are considered in this REC.
- b. No exceptional circumstances exist. For instance, there are no endangered species and no cultural resources with adverse impact that has not been resolved. There are no exceptional circumstances in which the proposed action would adversely affect "environmentally sensitive" resources or a reasonable likelihood of significant effects on public health, safety, or the environment.
- c. One (or more) CXs encompass the proposed action.

(i) CX b(2) applies to the proposed action because it is an "[e]mergency . . . assistance provided to federal, state, or local entities," in this case to federal entities, the DHS and DHHS. The assistance is of a temporary nature, indicating that it is in response to a short-term, emergency-related problem. The short suspense for the action also is indicative of an emergency situation. The executive orders discussed above as well as the President's comments also show that the requirement for housing for children and families is part of an emergency of national scope. Therefore, CX b(2) applies to the proposed action in its entirety, including both the development and operation of the temporary ICF.

(ii) CX b(4) applies to the proposed action to the extent that it will include the use of existing permanent facilities on Fort Bliss. It is anticipated that existing facilities may be utilized for various purposes, including (for example) office space for DHS and/or DHHS personnel. CX b(4) applies to the use of existing facilities under the proposed action provided this use is "within the scope and compatibility of the present functional use of the building," will not result in substantially increased or different waste streams and will remain within permit limits; the Army anticipates this will be the case.

(iii) CX f(1) applies to the actions proposed for Site Monitor for which there will be "no significant change in land or facility use." The use of the facilities will be limited to existing buildings and infrastructure, and would occur during both the development and operation of the temporary ICF. There will be no temporary or permanent construction covered by this exclusion. The proposed DHS and DHHS use does not represent a significant change in land or facility use.

(iv) CX g(1) applies to the proposed action in its entirety because it is anticipated that routine repair and maintenance of "buildings, airfields, grounds, equipment, and other facilities" will be necessary. In addition to the possible need for repair and maintenance of existing buildings (such as "repair of roofs, doors, windows, or fixtures"), it is also anticipated that some degree of routine grounds maintenance will be required, during both development and operation of the temporary ICF.

(v) CX h(4) applies to the proposed action in its entirety, as both the development and operation of the temporary ICF will require the routine management of solid and other types of waste "in compliance with EPA, Army, or other agency regulatory requirements." No new construction of permanent facilities for purpose of managing these wastes is anticipated.

Therefore CX b(2), CX g(1), and CX h(4) apply to the proposed action in its entirety and the other, above-referenced CXs apply to the portion taking place at Site Monitor.

## **CONCLUSION:**

The proposed action is covered by existing NEPA documents. As discussed above, none of the existing documents requires supplementation because of changes in impact or the affected environment. The 2007 and 2010 EISs cover the action in terms of the overall effect on the Fort Bliss cantonment area. The 2012 EA covers development of the parcel in question. The proposed action is well within the size of the development considered in the EA. The EA also considered permanent development while the proposed action is temporary. The discussion above of additional environmental safeguards and considerations also supports this determination. There are no unusual factors that would preclude coverage of these actions by the prior NEPA documents.

As explained above, Categorical Exclusions b(2), b(4), f(1), g(1), and h(4) apply respectively to exclude from further NEPA analysis the similar use of existing facilities, the use of existing facilities at Site Monitor by DHS/DHHS, the routine repair and maintenance of the grounds and facilities, and the management of waste resulting from the development and operation of the temporary ICF. There are no unusual circumstances that would prevent application of these CXs.

DHS will prepare a separate REC for its operations. The description of DHS requirements contained in this REC will be considered current as of the date of signature.

Signatories:

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**

(b) (6)

Chief HHS Environmental Officer  
Safety and Environmental Compliance, Environmental  
Health and Safety Services  
Program Support Center

U.S. Department of Health and Human Services  
Proponent

25 July 2018

Date

**FORT BLISS ENVIRONMENTAL COORDINATOR:**

(b) (6)

Chief, Environmental Division  
Directorate of Public Works

26 July 2018

Date

## RECORD OF ENVIRONMENTAL CONSIDERATION

**PROJECT TITLE:** DHHS Temporary Living Facilities for Unaccompanied Children at Fort Bliss, Texas

**BRIEF DESCRIPTION:** The U.S. Department of Health and Human Services (DHHS) has requested a 3-month permit for the use of Dona Ana Range Camp to provide temporary emergency shelter for up to 4,000 Unaccompanied Children (UC), ranging in age from 14 to 17 years, and support personnel. The existing barracks and associated latrines and administration buildings located on approximately 18.8 acres in the western portion of the camp will house up to 1,800 UC. Semi-permanent (soft-sided) structures to accommodate sleeping and recreational quarters for a possible 1,440 more UC will be constructed around existing latrines and laundry facilities located on approximately 22.6 acres to the east. All logistical support will be provided by DHHS. Fort Bliss will provide facility support as stated in the Memorandum of Agreement signed by the installation and the DHHS.

**REVIEW OF OTHER ENVIRONMENTAL CONCERNS:** A multi-discipline analysis of other environmental components determined that significant impacts to human or natural environmental from this action are unlikely because:

- Water for the range camp is obtained from two wells and purified in a single chlorine gas injection system before being pumped into the distribution system and into elevated storage tanks. Because many of the facilities have been unoccupied for some time, it is recommended that the main water system throughout the range camp and secondary water supply lines be flushed, and the water tested for lead content prior to occupation in the camp.
- Surveys for lead-based paint and asbestos containing materials have been conducted for many of the structures within Dona Ana Range Camp. Lead-based paint is present typically on thresholds, window sills, walls, beams, struts, columns, and floors. Asbestos was identified in wall and window caulking, sealant around wall penetrations, drywall, and joint compound. It is recommended that all previously painted interior wall surfaces, metal beams, struts, columns, pipes, and benches be repainted to ensure encapsulation of potential lead-based paint and asbestos containing materials and that painted floors be encapsulated with tile or some other material to prevent further abrasion. A detailed list of the results of survey for each structure and recommended remediation method is attached. Black mastic which may contain asbestos has been exposed under broken floor tiles was discovered in Building 8201. Testing this mastic is recommended to determine whether this material contains asbestos so that the best method of encapsulation can be performed.
- Because many of these facilities have been unoccupied for some time, an inspection for pest and rodent infestation is recommended prior to occupancy. Pest management is also recommended while the facility is in use. See attached guidance for indoor and outdoor pest management and disinfection procedures.

**PROJECT TITLE:** DHHS Temporary Living Facilities for Unaccompanied Children at Fort Bliss, Texas

- All waste generated by repair and maintenance activities will be disposed of in accordance with Fort Bliss policy. Medical waste from an onsite medical center will be collected and disposed of through a DHHS avbio-hazard disposal contractor in accordance with applicable regulatory requirements.
- Encountering unexploded ordnance (UXO) during demolition is unlikely. However if UXO is encountered, it must be disposed of by Explosive Ordnance Disposal (EOD) personnel per Fort Bliss approved procedures.
- Buildings 8107 through 8149, 8153, 8154, 8155, 8157, 8160, 8162, 8163, 8164, and 8203 through 8239 are eligible for listing on the National Register of Historic Places under a program alternative. These structures have been mitigated for ongoing operations, maintenance, repair, rehabilitation, and renovation; and there are no restrictions for building modifications or use. See attached Program Comment for Cold War Era Unaccompanied Personnel Housing (1946-1974) and letter from Fort Bliss to the New Mexico SHPO.
- Threatened and endangered species or special habitats will not be affected by this project.
- There are no sites that required remediation under the Defense Environmental Restoration Act which identifies, investigates, and cleans up contamination and military munitions associated with past activities and DOD facilities. No above ground storage tanks or underground storage tanks are located within the area of concern, and no petroleum or hazardous waste spills have been recorded near these facilities. If any soil discoloration, odors, rubbish and/or any environmental concerns are uncovered, work at the site of the discovery will be suspended but may continue in areas not affected. The Environmental Division of the Directorate of Public Works will be notified immediately of the findings.
- Mold was discovered in Building 8130. See attached photograph. It is recommended that additional investigation be conducted to determine the extent of the mold in Building 8130. Because the roofs on other buildings were found to have leaked as well, there is a possibility of additional mold. It is recommended that further investigation be conducted to determine if a mold condition exists in these buildings as well.
- An abandoned structure, Building 8268, is located within the overflow area. See attached photograph. It is assumed that it will not be used by DHHS as it is uninhabitable. Because of its close proximity to the other facilities, it is recommended that this structure be removed.

**ANTICIPATED DATE AND/OR DURATION OF PROPOSED ACTION:** The term of the outgrant is from 6 September 2016 to 31 December 2016.

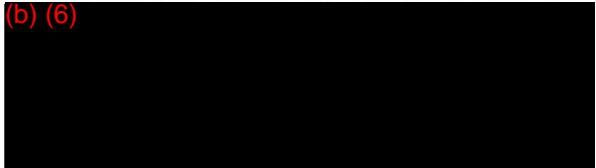
**PROJECT TITLE:** DHHS Temporary Living Facilities for Unaccompanied Children at Fort Bliss, Texas

**REASON FOR USING A RECORD OF ENVIRONMENTAL CONSIDERATION:** This action falls within the scope of impacts analyzed in the *Fort Bliss, Texas and New Mexico Mission and Master Plan Supplemental Programmatic Environmental Impact Statement* (SEIS), for which a Record of Decision was signed on 30 April 2007. It is also Categorically Excluded under 32 CFR 651, App. B, (f)(1). No extraordinary circumstances exist as per section 651.41, and the action meets all of the screening criteria as set in section 651.29.

**Signatories:**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES:**

(b) (6)



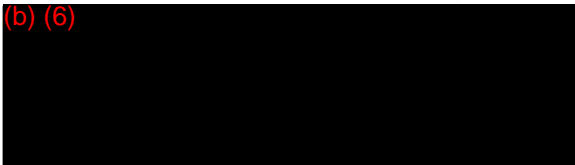
8-30-16

Date

Acting-Assistant Secretary for Children and Families  
U.S. Department of Health and Human Services

**FORT BLISS ENVIRONMENTAL COORDINATOR:**

(b) (6)



29 August 2016

Date

Chief, Environmental Division  
Directorate of Public Works